IMPERIAL MYCOLOGICAL INSTITUTE
24 OCT 1932

The Gardens' Bulletin

STRAITS SETTLEMENTS

Vol. VII. 15th SEPTEMBER, 1932. Part 1.

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PRINTERS LIMITED, SINGAPORE.

THE

GARDENS' BULLETIN

STRAITS SETTLEMENTS

Vol. VII. 15th SEPTEMBER, 1932. Part 1.

SOME MALAYAN ORCHIDS, III.

By C. E. Carr, F.L.S.

with plates 1—5.

Editorial Note. The following paper by Mr. Carr contains descriptions of one new genus (Cheirorchis) and 25 new species of orchids from the Malay Peninsula, 26 new records of previously described species found for the first time in the Peninsula, and three new varieties; there are also eight new combinations and notes on the nomenclature of some other species. There are three new species of Bulbophyllum § Epicrianthes, bringing the peninsular total of this very curious group to seven. The first peninsular representative of Bulbophyllum § Polyplepharon is also described.

The new species and new records are largely due to Mr. Carr's own collecting activities; most of the remainder are based on specimens collected by officers of the Singapore Gardens.

The only non-peninsular plant here described is *Vanda tricolor* var. *purpurea,* from the island of Alor, a number of plants of which are now in cultivation in Singapore.

The new species are: Coelogyne membranifolia, Microstylis reniloba, Diplocaulobium malayanum, Desmotrichum compressibulbum, Dendrobium striatellum, D. procumbens, D. ustulatum, Bulbophyllum pœkilon, B. Corneri, B. abbrevilabium, B. Haniffii, B. nigropurpureum, B. malleolabrum, B. carunculaelabrum, B. diplantherum, B. chekaense, B. cyclosepalon, Thelasis succosa, Adenoncos vesiculosa, Cheirorchis breviscapa, C. major, C. pulverulenta, Thrixspermum tenuicalcar, T. pulchrum, Pomatocalpa elongatum, Microsaccus truncatus.

The new varieties are: Dendrobium metachilinum Rchb. f. v. crenulatum, Bulbophyllum uniforum Hassk. v. pluriflorum, Vanda tricolor Lindl. v. purpurea.

The new combinations are: Desmotrichum luxurians, Bulbophyllum taluense, Bulbophyllum uniforum var. variebile, B. uniflorum var. rubrum, Chamaeanthus sarcanthoides,

Cheirorchis filiformis, Cheirorchis fulgens, Abdominea macranthera.

An index of species names will be found at the end of this paper.

Zeuxine gracilis, Bl. Fl. Jav. Orch. 56. t. 18, f. 2, t. 23D; J. J. S. Fl. Buit. VI (Orch.) 110; Atlas No. LXXVIII.— *Psychechilos gracile,* Breda Gen. et Sp. Orch. t. 9. *Monochilus gracile,* Lndl. Fol. Orch. fasc. V; Miq. Fl. Ind. Bat. III. 723.

Pahang, Tembeling, under *Hevea brasiliensis.* This species is new to the Peninsula.

Coelogyne membranifolia, sp. nov. (Plate 1) Pseudobulbi .50-1 cm. dissiti, quadrilateraliter ovoidei, 1-folii. Folium lanceolatum ad oblanceolato-oblongum, abrupte breviter subulato-acuminatum, acutissimum, tenue, plicatum. Inflorescentia folio immaturo synantha, nutans, laxe 2-3 florifera. Bracteae caducae. Sepalum dorsale oblongum vel oblongo-oblanceolatum, acutum vel apiculo minuto dentiformi obtusum. Sepala lateralia subfalcate oblonga vel anguste ovato-oblonga, acuta. Petala subfalcata, linearia e basi latiore lanceolata, subacuta. Labellum 3-lobum, basi leviter saccatum, carinis c. 5 fimbriarum seriebus 2 ferentibus, lobis lateralibus triangularibus obtusis, lobo intermedio late unguiculato lamina breviter late ovata obtusa, marginious integris. Apex gynostemii triangularis breviter acuminatus acutus marginibus nonnullis denticulis inconspicuis ferentibus, alis latis truncatis.

Rhizome creeping, stout, rooting, few-branched, .50-1 cm. diam., internodes .10-.20 cm. long. Pseudobulbs .50-1 cm. distant, quadrilaterally ovoid, sides concave, at first covered with membraneous scurfy pale green sheaths, pale green, up to c. 8 cm. long, 2 cm. diam., 1-leaved. Leaf lanceolate to oblanceolate-oblong, abruptly shortly subulato-acuminate, very acute, thin, plicate, above bright green with c. 5 conspicuous grooves, beneath paler with c. 5 strong ribs, up to c. 27 cm. long, c. 10 cm. wide, petiole deeply grooved up to c. 3.30 cm. long. Inflorescence appearing with the immature leaf, nodding or pendulous, laxly few (2-3)-flowered, peduncle slender terete thickened upwards up to c. 12 cm. long, rachis zigzag gradually elongating with internodes up to 2 cm. long. Bracts caducous. Flowers appearing singly on the elongating rachis, rather large, widely expanded. Sepals and petals pale yellow-green, median keel of sepals green. Dorsal sepal oblong or oblong-oblanceolate, very shortly acuminate, acute or obtuse with a minute tooth-like apiculus, cucullately incurved above the middle, apex slightly recurved, nerves 9 much-branched, outside convex

rather shiny strongly keeled, inside concave dull with a median groove, c. 4.50 cm. long, c. 2.30 wide. Lateral sepals subfalcately oblong or narrowly ovate-oblong, acute or subacute, nerves 9 much-branched, outside convex with a strong median keel rather shiny, inside dull concave with a median groove, c. 4.50 cm. long, c. 1.90 cm. wide. Petals slightly falcate, narrowly linear from a wider lanceolate base, subspathulately dilate below the subacute apex, nerves 3 sometimes with 4 short basal nerves added, margins slightly recurved, outside rather shiny, inside dull, c. 4.50 cm. long, base c. .35 cm. wide. Lip adnate to apex of column foot, 3-lobed, c. 5-nerved nerves much branched on midlobe, base slightly saccate bright red-brown, blade between sidelobes snow white, keels 5 from above base white surmounted by 2 rows of fimbriae median keel terminating at base of claw of midlobe outer keels at sinus of lobes inner keels continuing on midlobe straight to base of claw then abruptly divaricate parallel below apex and terminating on base of blade of midlobe, fimbriae of keels dark brown in upper half orange-red in basal half, the whole spread out c. 3.75 cm. long, across side lobes c. 3.70 cm. wide; side lobes subfalcate, triangular, obtuse, margins entire, anterior margin nearly straight c. .80 cm. long, posterior margin roundly curved c. 3.40 cm. long, c. 1 cm. wide, c. 7-nerved, pale brown spotted white, posterior margin white; midlobe clawed, margins entire, claw linear snow white with a median cuneate dark brown streak ending at apex in a transverse linear dark brown bar margins dark brown c. .50 cm. long 1.45 cm. wide, blade shortly broadly ovate roundly obtuse fleshy elevate in middle into a triangular tumid grooved patch white c. 1 cm. long c. 1.90 cm. wide. Column erect curved from below the middle, pale greenish yellow darker towards the base, base excepted suffused pale brown in lower half especially on the margins, wings broad truncate whitish, hood triangular shortly acuminate acute margins with a few inconspicuous teeth whitish, the whole c. 3.50 cm. tall, base slightly produced fleshy bright red-brown; clinandrium deeply conic-excavate; rostellum transversely oblong, whitish with a dull brown transverse narrow bar near apex, abruptly narrowed to the roundly triangular obtuse beak, the whole c. .50 cm. long and as wide; stigma quadrate, excavate, yellowish, anterior margin brown. Anther conic, 2-celled, seen from the front quadrate, bright cream, elevate above base into a conic obtuse papillose whitish boss, produced at apex into a short triangular obtuse transparently whitish beak, c. .45 cm. tall, including beak c. .70 cm. long, c. .50 cm. wide. Ovary short, curved, scurfy, ribs 6 conspicuous acute-angled, dull whitish green, c. .70 cm. long, pedicel terete whitish green c. .30 cm. long.

Pahang, Tembeling, on *Saraca bijuga.*

This is an attractive species of the affinity of *C. speciosa,* Lndl. and *C. xyrekes,* Ridl. It is, however, perhaps nearer to *C. celebensis,* J. J. S. from the Celebes which it resembles in general colour, but from that species it differs in the shorter fewer-flowered inflorescence, the shorter broader sepals and the keels of the lip which, while distinct, approach nearer to those of *C. speciosa,* Lndl.

Oberonia anthropophora, Lndl. in Wall. Cat. n. 1951; Gen. and sp. Orch. 16; Fol. Orch. Oberon. 7; Hook. f. Fl. Brit. Ind. v (1888) 684.

As a synonym the following should be added—: *O. aurantiaca,* Ridl. in Journ. Bot. 1898, 210; Mat. 1.18; Fl. Mal. Pen. IV, 15.

Distribution: Tenasserim.

Oberonia laeta, J. J. S. in Bull. Jard. Bot. Buit. Ser. III vol. IX, 40.

Singapore (Corner) epiphytic in mangrove swamps.

Pahang, Cheka river, on *Saraca.* Hitherto unrecorded from the Peninsula.

Distribution:—Java.

Oberonia pumilio, Rchb. f. in Bonpl. v (1857) 58; J. J. S. Fl. Buit. vi (Orch.) 246: *O. Treubii,* Ridl. in Journ. Linn. Soc. xxxii (1896) 219; J. J. S. Fl. Buit. vi (Orch.) 242, Atlas n. CLXXVIII: *Malaxis pumilio,* Rchb. f. Walp Ann. vi, 216.

Pahang, Fraser Hill at about 3,500 feet altitude. New to the Peninsula.

Distribution:—Java and Sumatra.

Oberonia semifimbriata, J. J. S. in Bull. Jard. Bot. Buit Ser. III vol. x, 46.

Pahang, Tembeling, on *Hevea.*

In the Tembeling plants the colour of the sepals and petals is rose while that of lip and column is deep rose. The anther is pale yellowish white with a median brownish keel above. In fresh flowers the dorsal sepal measures, including the fimbriae, c. .18 cm. long, c. .09 cm. wide, the lateral sepals c. .10 cm. long, c. .12 cm. wide, the petals c. .125 cm. long, c. .08 cm. wide. The plant is new to the Peninsula.

Distribution:—Sumatra.

Microstylis reniloba, sp. nov. Caulis validus basi vaginis tectus. Folia 6-7, oblique ovato-lanceolata, breviter acumi-

nata, acuta, subplicata, vaginis basi tubulosis supra patentibus. Inflorescentia terminalis, pedunculo plus minusve quadrilaterali, rachide multisulcata dense multiflora. Bracteae lanceolatae, acutae. Sepalum dorsale ovato-oblongum, obtusum. Sepala lateralia subfalcata, late elliptica, obtusa. Petala subfalcata, oblanceolatolinearia, retusa. Labellum trilobum, edenticulatum, basi fovea parva oblonga incrassatione semilunata cincta, lobis lateralibus reniformibus basi leviter incurvis obtusis, lobo intermedio triangulari leviter acuminato obtuso. Gynostemium breve, decurvo, alis magnis oblongis obtusis.

Stem stout, base covered with leaf sheaths, up to c. 13 cm. long, 1.50 cm. diam. Leaves 6-7, obliquely ovate-lanceolate, shortly acuminate, acute, subplicate, margins undulate, rather shiny bright green above sometimes suffused purple when young, beneath pale grey-green with c. 5-6 prominent nerves, the nerves often suffused purple, up to c. 17 cm. long, c. 6.75 cm. wide the upper one much smaller; sheaths tubular at the base the apical part spreading and forming an acute angle with the stem, deeply concave with incurved margins, sometimes suffused purple, up to 5 cm. long. Inflorescence terminal, peduncle more or less 4-sided purple c. 5.50 cm. long, rachis many-grooved densely many-flowered up to 9 cm. long or more. Bracts at first spreading then recurved appressed to the rachis, lanceolate, acuminate, acute, green, c. .70 cm. long, c. .25 cm. wide. Flowers well expanded, c. 1 cm. long and as broad. Sepals and petals green. Dorsal sepal erect, apex a little recurved, ovate-oblong, obtuse, 3-nerved, convex inside, concave outside, c. .72 cm. long, c. .36 cm. wide. Lateral sepals appressed to the underside of the lip, subfalcate, broadly elliptic, obtuse, 3-5-nerved, concave inside, cucullately convex outside towards the apex, c. .60 cm. long, c. .35 wide. Petals spreading, subfalcate, oblanceolate-linear, apex retuse, 1-nerved, margins strongly revolute, concave outside, c. .68 cm. long, c. .18 cm. wide. Lip 3-lobed, not toothed, a very small oblong fovea surrounded by a semilunate ridge at the base shiny bright green suffused darker from base of midlobe, spread out c. .75 cm. long from the tips of the auricles to the apex of the midlobe, c. .90 cm. wide across the side lobes; side lobes reniform, the base produced to a rounded slightly incurved obtuse auricle, c. .28 cm. long, many-nerved; midlobe triangular, slightly acuminate, obtuse, dark green c. .20 cm. long, c. .30 cm. wide. Column short, decurved dark green, arms large oblong obtuse. Ovary 6-grooved, curved to form a right angle with the pedicel, with pedicel c. 1 cm. long.

Perlis, on limestone (M. R. Henderson). Cultivated in H. B. Singapore.

This is allied to *M. Wallichii* Lndl. from which it differs in the entire miblobe with a very distinct angular sinus between the lobes and in the colour. From the Siamese *M. sutepensis,* Rolfe it is distinguished by the broader sepals and petals and the much broader distinctly 3-lobed lip.

Described from living plants.

Liparis rhombea, J. J. S. in Bull. Dep. Agr. Ind. Néerl. XLIII (1910) 35; Bull. Jard. Bot. Buit. Sér 3 vol. V. t. 35 f. III.

Pahang, Tembeling. This pretty little plant, now recorded in the Peninsula for the first time, occurs rather uncommonly on *Saraca* and other small trees in the forest.

Distribution:—Java.

Agrostophyllum cyathiforme, J. J. S. in Fl. Buit. VI Orch. (1905) 291; Pahang, Fraser Hill, altitude c. 4,000 ft.; hitherto unrecorded from the Peninsula.

Distribution:—Java.

Agrostophyllum tenue, J. J. S. in Bull. Jard. Bot. Buit. 2nd Ser. xxvi (1918), 33; l.c. 3rd Ser. v, t. 36 f. 1.

Pahang, Fraser Hill at 4,000 feet altitude. The first record for the Peninsula.

Distribution:—Java.

Ceratostylis gracilis, Bl. Bijdr. 306; Lndl. Gen. x Sp. Orch. 231; Miq. Fl. Ind. Bat. III. 706; J. J. S. in Fl. Buit VI Orch. (1905) 300; Atlas No. CCXXX.

Pahang, Fraser Hill, altitude c. 3,500 feet; the first record for the Peninsula.

Distribution:—Java.

Diplocaulobium malayanum, sp. nov. Pseudobulbi approximati, e basi apicem versus exterius decrescentes, apice dilatato, 1-folii. Folium anguste ellipticum, base subtortum profunde sulcatum. Inflorescentiae ex apice pseudobulbi fasciculatae, uniflorae. Sepalum dorsale e basi triangulari longe subulato-acuminatum, acutum. Sepala lateralia pedi gynostemii adnata mentum incurvum oblongum obtusum formantia, super basin valde furcata triangularia, longe subulato-acuminata, acuta, margine antico super basin rotundate dilatato. Petala linearia, sub medio subulato-acuminata, acuta. Labellum 3-lobum, carinibus 3 e basi usque ad apicem unguis lobi intermedii attingentibus, carina intermedia humili recta, exterioribus conspicuis basi rectis super basin sinuosis; lobi laterales triangulares, obtusi, margine postico curvulo; lobus intermedius usque ad medium fere unguiculatus, lamina abrupte dilatata triangulari obtusa.

Pseudobulbs approximate, erect, cylindric above the fusiform base, tapering towards the dilate apex, laterally flattened, the old ones longitudinally wrinkled, yellow-green, c. 25 cm. long, c. .85 wide above the base, 1-leaved. Leaf erect, narrowly elliptic, base subtwisted deeply grooved above, keeled beneath, with c. 4-5 elevate nerves on each side when dry, green, c. 16 cm. long, c. 2.10 cm. wide. Inflorescences from tufts of large dry sheaths at the apex of the pseudobulb, fascicled, appressed to the base of the leaf, erect, 1-flowered. Flower rather small for the genus, well expanded. Upper sepal long subulate-acuminate from the triangular base, acute, 5-nerved, furfuraceo-punctate, margins incurved, deeply concave inside, highly convex outside, c. 2.70 cm. long, c. .30 cm. wide at the base. Lateral sepals adnate to the column foot and forming with it an incurved oblong obtuse mentum, strongly falcately curved above the base, triangular, long subulate-acuminate, acute, 5-nerved, furfuraceo-punctate, margins incurved the anterior margin dilate above the base into an oblong slightly rounded obtuse lobe, deeply concave inside, highly convex outside, c. 2.70 cm. long, c. .40 cm. wide at the base, mentum c. .30 cm. long. Petals linear, long subulate-acuminate from below the middle, acute, 3-nerved, very sparsely furfuraceo-punctate, margins incurved, deeply concave inside, highly convex outside, c. 2.55 cm. long, c. .15 wide. Lip 3-lobed, base erect, right-angularly recurved above, keels 3 on the blade raching to the apex of the claw of the midlobe, the median keel low and straight, the outer ones straight at the base then conspicuously elevate sinuous, spread out c. 1.20 cm. long, c. .50 cm. wide across the side lobes; side lobes triangular, obtuse, the posterior margin curved; midlobe clawed, the claw oblong c. .30 cm. long, blade abruptly dilate triangular obtuse c. .50 cm. long and as broad. Column arched, clinandrium excavate, c. .28 cm. long.

Johore (J. Laycock). The exact locality is not known.

Described from a living pseudobulb and leaf and a flower preserved in spirit.

Desmotrichum compressibulbum, sp. nov. Rhizoma breve, ramosissimum. Caules erecti velpatentes, ramosi, primario internodis basalibus 3-4 subteretibus leviter lateraliter compressis apicem versus dilatatis internodo apicali super basin in pseudobulbum ovatum vel ellipticum valde lateraliter compressum carinatum abrupte dilatato unifolio, ceteris similibus. Folium ovato-lanceolatum, breviter bidentatum. Inflorescentiae e squamis siccis apici pseudobulbi pone folium gestatae, breves, uniflorae. Sepalum dorsale oblongum, obtusum, brevissime conico-

apiculatum. Sepala lateralia triangulari-oblonga, subacuta, brevissime conico-apiculata, margine antico in lobum brevissimum triangularem obtusissimum producto, mento conico obtuso. Petala lanceolata, acuminata, subacuta. Labellum 3-lobum, lobis lateralibus triangularibus obtusis margine antico suberoso, lobo intermedio unguiculato ungué lineari lamina profunde bilobata lobis falcatis oblongis obtusis, carinis inter lobos laterales 3 exterioribus super unguem lobi intermedii sinuosis ceterum rectis. Gynostemium brevissimum, brachiis linearibus, pede longo lineari apici incrassatione humili donato marginibus incrassatis.

Rhizome short, creeping, much branched, shinily green, c. .45 cm. diam., internodes .10-.20 cm. long. Stems c. 4 cm. distant, erect or spreading, branched, shinily yellow-green, c. 13 cm. long; primary stem covered at first with tubular membraneous sheaths, basal internodes 3-4 subterete slightly laterally flattened dilate towards apex shinily yellow-green .30-2 cm. long a brown ring at each node, apical internode abruptly thickened above base into a pseudobulb ovate or elliptic strongly laterally flattened longitudinally wrinkled keeled in front and on back the front keel produced and incurved at apex up to c. 3.50 cm. long c. 2 cm. wide c. .70 cm. thick 1-leaved, upper stems similar but with fewer internodes and towards apex smaller pseudobulbs. Leaf erect or spreading, ovate-lanceolate, shortly narrowly obtusely bidentate, coriaceous, margins sometimes slightly revolute, above grooved shinily dark green with c. 10 fairly conspicuous yellowish nerves, below opaque grey-green strongly keeled, base very shortly narrowed slightly twisted, c. 8 cm. long, c. 3.50 cm. wide. Inflorescences from behind rarely before the leaf, fasciculate, short 1-flowered, base surrounded by dry sheaths, peduncle terete c. .75 cm. long sheath tubular c. .67 cm. long. Bract very short, appressed to pedicel, triangular, acute, c. .10 cm. long and as wide. Sepals and petals pale ochre-yellow. Dorsal sepal recurved from below middle, oblong, obtuse, very shortly conic-apiculate, 5-nerved nerves branched, inside convex, outside concave scurf-dotted keeled the keel more conspicuous towards the base, c. .90 cm. long, c. .50 cm. wide. Lateral sepals running down to apex of column foot, recurved above middle, triangular-oblong, subacute, very shortly conic-apiculate, 7-nerved nerves branched, inside concave towards base convex towards apex, outside convex towards base concave towards apex scurf-dotted, anterior margin produced at base to a very short triangular obtuse lobule c. .20 cm. long, anterior margin c. 1.30 cm. posterior c. 1 cm. long, c. .66 cm. wide at base of posterior margin, mentum conic obtuse slightly incurved towards apex c. .60 cm. long. Petals subparallel, lanceolate, acuminate, subacute, 3-nerved nerves branched, irregularly marginate, inside slightly

convex, outside slightly concave, c. .70 cm. long, c. .38 cm. wide. Lip adnate to apex of column foot, 3-lobed, recurved above side lobes, keels 3 from base almost reaching to apex of claw of midlobe, outer keels straight between side lobes strongly sinuate on claw of midlobe, median keel very inconspicuous in basal half papillose in middle conspicuous above middle and dilate caruncled towards apex, the whole spread out c. 1.60 cm. long, c. 1 cm. wide across side lobes; side lobes erect, triangular, obtuse, anterior margin suberose c. .35 cm. long, posterior margin c. .70 cm. long, pale ochre-yellow; midlobe clawed, claw linear margins slightly dilate and sinuate towards apex pale ochre-yellow c. .45 cm. long c. .30 cm. wide, blade abruptly dilate bilobed almost to base with the sinus between lobes rounded, lobes falcate oblong obtuse posterior margin suberose bright ochre-yellow c. .55 cm. long c. .30 cm. wide, whole blade c. .65 cm. long c. .60 cm. wide. Column very short, stout, pale yellowish, c. .25 cm. long, c. .35 cm. wide at the stigma, arms erect linear slightly diverging narrowed towards apex, clinandrium deeply excavate transversely oval, rostellum yellow-green, stigma large excavate transversely oval. Anther conic, retuse, 2-celled, keeled in front, produced to a short broad truncate ciliolate white beak, bright green, c. .15 cm. tall and as broad. Pollinia 4, linear-obovate, laterally flattened, yellow. Column foot long, linear, incurved below middle, margins thickened in the form of a keel, inside concave with a low orange thickened area (nectary) at apex, pale ochre-yellow, c. .50 cm. long, c. .30 cm. wide. Ovary 6-grooved, densely scurfdotted, c. .70 cm. long.

Pahang, Fraser Hill in the upper Jeriau valley, altitude c. 3,500 feet.

This species is a close ally of *D. pallidiflorum*, Ridl., a low country plant. It is at once distinguished, however, by the much larger size of the plant, the broad strongly laterally flattened pseudobulbs, the broader leaves, and the structure of the lip. The claw of the midlobe in *D. compressibulbum*, Carr is linear, very slightly dilate at the actual apex and is more than twice as long as in *D. pallidiflorum*, Ridl. in which species it widens upwards from the base. The outer keels in the present plant are more than twice as tall as in *D. pallidiflorum*, Ridl.

Described from living material.

Desmotrichum luxurians, new comb. *Dendrobium luxurians*, J. J. S. in Bull. Jard. Bot. Buit. Ser. 3 (1921) 288, t. 4. f II.

Pahang, Tembeling.

Distribution:—Java and Borneo.

Dendrobium *(§ Distichophyllae)* **metachilinum,** Rchb. f. **var. crenulatum,** var. nov. This differs from the typical plant in the more slender rather curved mentum and in the midlobe of the lip the margins of which are crenulate and not nearly so fleshy.

Cultivated in H. B. Singapore, origin Johore.

Dendrobium *(§Bolbodium)* **striatellum,** sp. nov. Planta parva, caespitosa. Caules approximati, erecti suberective, e basi terete fusiformes, canaliculati, apici 2-folii. Folia lanceolata vel oblongo-lanceolata, obtusa, carnosa. Flores e squamis siccis inter folia intervallis singulatim gestati. Sepalum dorsale triangulari-ovatum, apiculatum. Sepala lateralia triangularia apiculata, mento cylindrico ventre applanato sub apice breviter conico distincte angustato. Petala lincaria vel lineari-oblanceolata, obtusa. Labellum integrum, obovato-oblongum, brevissime retusum, carina media lata humili tenuiter canaliculata e basi sub apice fascia semilunata verrucoso-pustulosa terminata. Brachia gynostemii triangularia acuta. Pes gynostemii oblongus, carina media sub apice pulvinum quadratum tumidum ferente.

A small tufted plant. Rhizome short, creeping, branched, copiously rooting, roots elongate filiform much branched. Stems approximate, erect or suberect, at first covered with membraneous sheaths, olive-yellow often suffused red, up to c. 7.50 cm. long, internodes 6, basal 2 internodes very short terete, third and fourth longer terete thickened upwards up to respectively .80 and 2 cm. long, fifth internode supporting the lower leaf from base to c. .80 cm. terete grooved then thickened fusiform with c. 8 conspicuous ribs separated by wide grooves, upper internode very short supporting the upper leaf. Leaves 2, lanceolate or oblong-lanceolate, apex obtuse with a minute seta or sometimes oblique, fleshy, above convex on each side of a median groove dark green sometimes tinted red, beneath slightly concave on each side of af fairly conspicuous median keel paler, lower one larger up to c. 3.20 cm. long, c. 1.20 cm. wide, petiole broad concave not very fleshy c. .30 cm. long. Flowers appearing singly at intervals from tufts of dry bracts between the leaves, each stem bearing up to c. 6 tufts in a bundle. Sepals and petals white with some very inconspicuous red-purple streaks towards base. Dorsal sepal triangular-ovate, apiculate, apiculus low conic obtuse, c. 5-nerved nerves branched, outside sparsely furfuraceous, c. .59 cm. long, c. .29 cm. Lateral sepals adnate to column foot forming a mentum c. .35 cm. long cylindric flattened in front distinctly narrowed below the short conic grooved apex, triangular, apiculate, apiculus low conic obtuse, c.

5-nerved nerves branched, outside sparsely furfuraceous, c. .59 cm. long, c. .50 cm. wide, anterior margin c. 1.60 cm. long produced to a narrowly triangular lobe. Petals linear or linear-oblanceolate, obtuse, 3-nerved nerves branched, c. .57 cm. long, c. .15 cm. wide. Lip adnate to apex of column foot, obovate-oblong, very shortly retuse, 3-nerved nerves much branched, a broad low shallowly grooved keel from base ending below apex in a semi-lunate pale orange verrucoso-pustular patch, warty and papillose towards apex, margins undulate above base thickened warty and papillose towards apex, white, nerves and margins red-purple, spread out c. 1.27 cm. long, c. .65 cm. wide. Column very short, whitish, arms triangular acute cream, c. .15 cm. tall, clinandrium quadrate deeply excavate, rostellum transversely oblong, stigma deeply excavate quadrate. Anther conic, rather flattened in front, seen from the front quadrate, 2-celled apex produced to a short truncate-retuse minutely toothed beak, c. .13 cm. long and as broad. Column foot oblong, incurved above middle, whitish, a median red-purple keel supporting below the apex a small quadrate tumid yellow cushion, margins incrassate in the form of a red-purple keel, sparingly furfuranceo-punctate on back, c. 1.35 cm. long, c. .38 cm. wide. Ovary conspicuously narrowly 6-ribbed, furfuraceo-puncticulate, cream, c. .20 cm. long, pedicel terete slightly thickened upwards, sparingly scurfy, whitish, c. .90 cm. long.

Kelantan, Gua Musang, altitude c. 500 feet. Flowered at Tembeling on September 9th 1929, one day before *D. pumilum,* Roxb. and a few days after *D. quadrangulare,* Par.

It is very close to *D. pumilum,* Roxb. but it is a stouter plant, the flower has a narrower mentum and the lip is much more pustular and papillose with the median keel more conspicuous. The colour is different, the sepals and petals being unmarked while the streaks on the lip are much shorter and, together with those on the column, are of a bright red-purple. It further differs in the flowering periods.

Dendrobium *(§Bolbodium)* **procumbens,** sp. nov. Rhizoma repens, ramosum. Caules alternati, procumbentes, internodiis 4 basalibus 2 teretibus tertio valde dilatato subgloboso vel quadrilateraliter cylindrico lateribus concavis, apici 2-folii. Folia oblonga, oblongo-ovata vel oblongo-lanceolata, obtusa vel brevissime inaequaliter obtuse bilobata. Flores e squamis siccis inter folia intervallis singulatim gestati. Sepalum dorsale late lanceolatum, acutum. Sepala lateralia rotundate triangularia obtusa, mento brevi conico obtuso. Petala lineari-lanceolata, acuta.

Labellum oblongo-obovatum, apici breviter bilobatum, apicem versus pustulosum, marginibus undulatis apicem versus denticulatis et conspicue pustulosis, carina media lata canaliculata pustulosa apici grosse pustulosa. Pes gynostemii elongatus, oblongus, carina media sub apice pulvinum quadratum tumidum verrucosum ferente, marginibus in forma carinae incrassatis.

Rhizome creeping, terete, branched, rooting, at first covered with tubular membraneous sheaths breaking up later into fibres, c. .12-.20 cm. diam., internodes c. .15-.30 cm. long. Stems alternate, procumbent, apex 2-leaved, internodes 4 basal 2 terete thickened upwards c. .18-.28 cm. long third internode much thickened above the terete base in the form of a pseudobulb subglobose or quadrilaterally cylindric dilate above base of thickened part sides broadly concave base covered at first with 2 tubular membraneous sheaths 1-2.50 cm. long c. .68-.85 cm. diam. apex supporting the lower leaf upper internode very short supporting the upper leaf. Leaves oblong, oblong-ovate or oblong-lanceolate, apex obtuse or very shortly unequally obtusely bilobed, very fleshy, above convex on each side of a median groove, beneath convex on each side of a median keel, lower one larger c. 1.40-2.20 cm. long, c. .90-1.20 cm. wide, petiole very short fleshy grooved up to c. .15 cm. long. Flowers from between the leaves at apex of stem, appearing singly from a tuft of dry bracts. Dorsal sepal broadly lanceolate, acute, 3-nerved nerves branched, outside at base furfuraceo-punctate, c. .70-.90 cm. long, c. .35-.45 cm. wide. Lateral sepals adnate to column foot forming a short conic obtuse mentum, roundly triangular, obtuse, nerves 5 much branched, outside sparsely furfuraceo-punctate, posterior margin .70-.90 cm. long, anterior margin produced curved forming a triangular lobe c. 1.70 cm. long. Petals linear-lanceolate, acute, 1-nerved the nerve branching on each side from near the base with many short branches above, .70-.90 cm. long, .17-.22 cm. wide. Lip adnate to apex of column foot, oblong-obovate, apex shortly roundly bilobed 3-nerved the outer nerves much branched, towards apex pustular, margins undulate towards apex toothed and conspicuously pustular remainder inconspicuously pustular, median keel broad low grooved sparsely warty apex conspicuously pustular, spread out c. 2 cm. long, c. 1.10 cm. wide, keels c. 1.60 cm. long. Column very short, broad, c. .15 cm. tall, back broadly retuse, clinandrium excavate transversely oblong, rostellum short broad, stigma excavate transversely oblong. Anther conic, flattened in front and behind, seen from the front roundly sub-quadrate, beak very short roundly truncate, 2-celled cells small narrow, c. .19 cm. tall. Column foot elongate, oblong, incurved below middle, inside deeply concave with a median keel supporting near the apex a quadrate

tumid warty cushion, margins thickened in the form of a keel, outside strongly keeled along the middle, c. 1.30 cm. long, c. .70 cm. wide. Ovary 6-sulcate, .30-.40 cm. long, pedicel terete 1.20-1.40 cm. long.

Pahang, Cameron Highlands, altitude c. 4,800 feet, April 2nd 1930, No. 23325 and A 473 (Holttum and Henderson). "Sepals, petals and mentum pale yellow flushed pink within, veined pink outside. Lip pale yellow with a slightly darker callus."

A distinct species with rather long-creeping rhizome and short much swollen stems.

Dendrobium *(§ Bolbodium)* **ustulatum,** sp. nov. Rhizoma repens, ramosum. Caules subapproximati, alternati, procumbentes, brevissimi, 2-folii, internodiis 3 intermedio e basi abrupte dilatato quadrilateraliter oblongo-globoso. Folia ovato-oblonga, subacuta vel minute inaequaliter bilobulata, crasse carnosa. Flores e squamis siccis inter folia intervallis singulatim gestati. Sepalum dorsale anguste triangulari-ovatum, subacutum vel anguste apiculatum. Sepala lateralia rotundate triangularia, obtusa vel obtuse apiculata, mento brevissimo conico obtuso canaliculato. Petala linearia, breviter acuminata, subacuta. Labellum cuneato-oblongum, apicem versus papillosum et pustulosum, marginibus apicem versus incrassatis denticulatis crispis, apice retuso, carina media conspicua lata sulcata sub apice fascia parva pustulosa terminante. Gynostemium breve, brachiis percarnosis truncatis medium prope in dentem brevem productis. Pes gynostemii linearis, marginibus incrassatis, carina media sub apice pulvinum parvum pustulosum ferente.

Rhizome creeping, branched, rooting, c. .20 cm. diam., internodes c. .20 cm. long. Stems subapproximate, alternate, procumbent, internodes 3 basal one terete dilate upwards .15-.40 cm. long, upper one very short supporting the upper leaf, median internode abruptly dilate from base quadrilaterally oblong-globose slightly rugose .60-1 cm. tall .40-.60 cm. wide .30-.50 cm. thick or elongate narrow quadrilaterally cylindric up to c. 1.75 cm. long, c. .27 cm. wide, c. .19 cm. thick, olive-yellow, supporting the lower leaf. Leaves 2, lower one larger, ovate-oblong, subacute or minutely unequally bilobed, very fleshy, above convex on each side of a median groove, beneath rather flat on each side of a median keel, dark green sometimes suffused red, 1-1.50 cm. long, .50-.90 cm. wide, base twisted, petiole very short fleshy grooved up to c. .10 cm. long. Flowers appearing singly at intervals from a tuft of dry bracts between the leaves, small, up to c. 1 cm. long. Dorsal sepal erect, slightly recurved towards apex, narrowly triangular-ovate, subacute or narrowly apiculate, 3-nerved nerves branched,

outside sparsely furfuraceo-punctate, pale yellowish suffused purple towards apex, nerves pale purple, c. .42 cm. long, c. .20 cm. wide. Lateral sepals adnate to column foot, roundly triangular, obtuse or obtusely apiculate, a little reflexed towards apex, 5-nerved nerves branched, outside sparingly scurf-dotted, pale yellowish suffused pale purple towards apex, nerves pale purple, c. .30 cm. long, c. .25 cm. wide, anterior margin produced to a long triangular obtuse lobe c. .67 cm. long, mentum very short conic obtuse grooved pale yellowish veined pale purple. Petals linear, shortly acuminate, subacute, sub-3-nerved, pale yellowish with the median nerve pale purple, c. .38 cm. long, c. .09 cm. wide. Lip adnate to apex of column foot, cuneate-oblong, retuse, below apex rather abruptly dilate papillose and pustular especially towards margins, apical angles rounded, nerves 3 from base much branched above, margins towards apex thickened toothed pustular crisped, median keel from base conspicuous broad grooved ending at the dilate part in a small yellow-green pustular patch, whitish to pale greenish white towards apex, keels white, about 5 longitudinal purple veins outside in lower 2/3, c. .85 cm. long, c. .50 cm. wide at the dilate part. Column short, whitish, arms rather fleshy truncate with a short tooth near the middle, c. .20 cm. tall, clinandrium rather deeply excavate transversely oblong, rostellum small rather fleshy semilunate truncate, stigma transversely oval. Anther conic, flattened in front, 2-celled, a short apical groove on back, c. .10 cm. long, c. .13 cm. wide. Pollinia 4, in unequal pairs, outside ones of each pair larger, obpyriform, flattened, concave inside, c. .07 cm. long. Column foot linear, incurved beyond middle, whitish, margins thickened purple, a median purple keel supporting bellow apex a small pustular yellow cushion, c. .75 cm. long, c. .25 cm. wide. Ovary 6-grooved, scurf-dotted, c. .20 cm. long, pedicel terete c. .80 cm. long.

Pahang, Fraser Hill at Ulu Jeriau, altitude c. 3,500 feet.

This is the smallest species in the section that I know. It is most nearly related to the preceding.

Dendrobium *(§ Grastidium)* **indragiriense** Schltr. in Fedde, Repert. IX, 164 (1911); *D. isomerum* Schltr. in Engl Jahrb. XLV, Beibl. 104 (1911), 35; *D. inconspicuiflorum* J. J. S. in Bull. Jard. Bot. Buit. Ser. 2, XXV (1917), 42; Carr in Gard. Bull. S. S. V (1929), pl. IV fig. B.

According to Dr. J. J. Smith, his plant is identical with that described by Schlechter in the Repertorium. *D. isomerum* Schltr. is a peloric state.

Bulbophyllum armeniacum, J. J. S. in Bull. Jard. Bot. Buit. Ser. 2. XXV (1917), 70. Pahang, Fraser Hill, alti-

tude c. 4,000 feet, a single plant growing on a fallen tree at the top of the path to Pine Tree Hill, June 1928. This is the first record from the Peninsula.

Distribution:—Sumatra.

Bulbophyllum *(§ Globiceps)* **poekilon,** sp. nov. Rhizoma gracile, breviter repens. Pseudobulbi approximati, procumbentes, ad rhizoma adnati, dorso complanati, 1-folii. Folium ellipticum vel oblanceolato-ellipticum, acutum. Inflorescentia e basi pseudobulbi, brevis, dense c. 12-florae. Bracteae ovatae, breviter acuminatae, acutissimae. Flores vix expansi, carnosuli. Sepalum dorsale lanceolatum, acutum, papillosum et breviter pilosum. Sepala lateralia falcata, triangularia, acuta, dense breviter pilosa. Petala unguiculata, super unguem elliptica obtusa, ungue excepto minute papillosa, marginibus ungue excepto ciliolatis. Labellum immobile, 3-lobum, intus omnino transverse lamellato-rugulosum, extus dense papillosum, marginibus ciliolatis, lobis lateralibus erectis triangularibus subacutis, lobo intermedio lanceolato subacuto. Gynostemium breve, e basi clavato-dilatatum, alis magnis quadratis, pede lineari basi in gibbum latum humilem conicum elevato.

Rhizome slender, creeping, slightly branched, copiously rooting from base of pseudobulbs. Pseudobulbs approximate, prostrate, adnate to the rhizome, oblong, flattened on back, longitudinally wrinkled when old, dull olive often suffused red, c. .60 cm. long, c. .45 cm. wide, c. .35 cm. thick, 1-leaved. Leaf elliptic or oblanceolate-elliptic, apex acute incurved, base slightly twisted, thickly fleshy, above grooved dark green often suffused red, beneath keeled often entirely red with the margins and keel darker, 2-3.50 cm. long, 1.25-1.80 cm. wide, petiole grooved often dark red .03-.10 cm. long. Inflorescence from base of pseudobulb, very short, densely c. 12-flowered; peduncle hardly exsert from the sheath of the pseudobulb, covered with membraneous tubular sheaths, stout, green suffused red, c. .50 cm. long; rachis thickened, entirely concealed by the congested flowers, green suffused red, c. .50 cm. long. Bracts ovate, shortly acuminate, very acute, much exceeding (c. 3 times) the ovary, appressed to ovary and base of sepals, margins towards apex slightly erose, inside concave, outside convex keeled, bright purple, c. .40 cm. long, c. .32 cm. wide. Flowers hardly expanded, rather fleshy. Sepals and petals pale greenish densely spotted dark red inside. Dorsal sepal porrect, lanceolate, acute, base thickened, inside concave densely papillose except at base, outside convex papillose and shortly hairy, c. .48 cm. long, c. .20 cm. wide. Lateral sepals running to below apex of column foot, porrect below the lip, falcate, triangular-ovate, acute, base thickened, anterior margins incurved contiguous in basal half parallel

in upper half, posterior margins strongly incurved nearly contiguous towards the base to the margins of the upper sepal, inside convex towards anterior margin acutangularly concave towards posterior margin base excepted densely shortly hairy, outside convex papillose and shortly hairy, c. .53 cm. long, c. .33 cm. wide. Petals base clawed, claw linear, above elliptic obtuse, claw excepted minutely hairy, margins with exception of claw ciliolate, inside concave, outside convex, c. .30 cm. long, c. .10 cm. wide, claw c. .08 cm. long. Lip adnate to apex of column foot, immobile, 3-lobed, inside grooved from base to middlle of midlobe densely transversely lamellato-rugulose, outside conspicuously transversely grooved at base densely papillose, margins of lobes ciliolate, spread out c. .22 cm. long c. .13 cm. wide across the side lobes; side lobes very small erect triangular subacute greenish suffused and spotted dark red; midlobe lanceolate, subacute, recurved above base, inside in basal 2/3 deeply concave elevate near the margins in the form of a keel convex towards apex, greenish spotted red. Column short, clavate-dilate from the base, wings subporrect quadrate truncate from a narrower base, bright yellow-green, c. .11 cm. long, rostellum semilunate, stigma suborbicular. Anther cucullate, 2-celled, strongly carinato-elevate above, seen from above transversely suboval, bright yellow, c. .03 cm. long, c. .04 cm. wide. Pollinia 4 cohering in 2 diverging cuneate-ovoid bodies, pale yellow, c. .02 cm. long. Column foot making an obtuse almost a right angle with the column, linear, dark red, incurved towards the abruptly attenuate whitish apex, a broad low conic red gibbus at base. Ovary 6-grooved, dilate from a narrow base, very short, roundly curved, yellow-green.

Pahang, Fraser Hill on tall trees at an altitude of c. 4,000 feet. This is a curious little plant much resembling when sterile *B. purpurascens*, T. & B.

Bulbophyllum *(§ Epicrianthes)* **Corneri,** sp. nov. Rhizoma pendulum. Pseudobulbi alternati, quadrilateraliter ovoidei lateribus concavis, unifolii. Folium ellipticum, obtusum, carnosum, marginibus recurvis. Inflorescentiae c. 3 e basi pseudobulbi, fasciculatae, uniflorae. Sepala ovata, breviter acuminata, acuta, marginibus angulatis attenuatis concavis. Petala brevissima, apici biloba, lobis appendices 3 lineares obtusos papillosos ferentibus, appendice 1 in sinu lato addito. Labellum mobile, integrum, ovoideum, acutum, supra et subtus sulcatum, marginibus basi in lobum magnum rotundatum productis, ultra lobos basales omnino puberulum, lateribus super lobos in pulvinum obliquum vesiculosum dilatatis. Gynostemium rectum, alis triangularibus obtusis margine postico minute denticulato, marginibus clinandrii dentatis.

Rhizome pendulous, slightly sinuous, densely rooting at base with a few extra roots above, basal roots appressed to the substratum upper roots appressed to the rhizome, covered with dry sheaths, up to c. 22 cm. long, c. .20 cm. diam. Pseudobulbs up to c. 2 cm. distant, alternate, forming an acute angle with the rhizome, quadrilaterally ovoid, sides concave, wrinkled, almost covered with a large dry sheath, sometimes slightly curved, yellow-green, up to c. 1.30 cm. long, c. .50 cm. diam., 1-leaved. Leaf horizontally spreading, elliptic, apex obtuse slightly recurved, very fleshy, wrinkled when old, margins recurved, above convex grooved, beneath concave keeled, base slightly twisted, yellow-green or bright green duller beneath, c. 3.85 cm. long, c. 1.60 cm. wide, petiole grooved fleshy c. .05 cm. long. Inflorescences c. 3 from base of pseudobulb, fasciculate, covered by the sheath of the pseudobulb, appearing singly at intervals, short, 1-flowered, peduncle terete c. .45 cm. long. Bract tubular, apex abruptly acuminate very acute. Flower curved upwards, widely expanded, lasting 1 day. Sepals slightly recurved from base, laterals running to about the middle of the column foot, ovate, shortly acuminate, acute, fleshy, base 5- above 7-nerved, margins angularly attenuate concave outside incurved towards apex, pale ochre or olive-ochre heavily dotted and suffused pale rose inside except on margins, c. .55 cm. long, c. .29 cm. wide. Petals very short, 2-lobed from near the base with a broad sinus between the lobes, bright rose, lobes diverging apex curved outwards bearing 3 stipitate appendages with one extra in the sinus, posterior lobe oblong-ovate posterior margin slightly dilate above base c. .05 long anterior lobe shorter linear anterior margin abruptly triangularly dilate below apex, appendages linear obtuse rigid 1-nerved unequal grey covered with dark grey papillae up to c. .25 cm. long stipes filiform very short white, the whole excluding appendages c. .06 cm. long, c. .14 cm. wide at base. Lip stipitate on apex of column foot, mobile, entire, fleshy, ovoid, acute, basal 1/3 excepted entirely puberulous, above grooved to about the middle, 2 large rounded fleshy erect lobes at base with the anterior margin produced above to a keel running to about the middle, a median elevate warty-tumid puberulous ridge running from about the middle to the apex, sides beyond the basal lobes swollen to a cushion bearing rows of dark red shiny vesicles running obliquely downwards to below the apex an inconspicuous puberulous keel from above the cushion to the apex, beneath transversely grooved at base swollen to 2 low rounded gibbi above base and grooved from above base to apex, dark red, c. .37 cm. long, c. .15 cm. diam. Column straight, white dotted red on back at apex, c. .15 cm. long, arms triangular obtuse the posterior margin minutely toothed, clinandrium excavate margins toothed,

stigma deeply excavate narrow linear. Anther transversely oval, shallowly 2-celled, pale ochre, beak ovate retuse highly convex bright ochre, a red spot on each side at base of beak, the whole c. .06 cm. long, c. .05 cm. wide. Pollinia 4 in 2 pairs, inner one of each pair smaller, outer ones seen from above elliptic flattened inside seen from the side oblong abruptly acuminate subacute, shinily bright yellow, c. .05 cm. long. Column foot incurved about the middle, linear, fleshy, whitish yellow, c. .10 cm. long Ovary 6-grooved, scurf-dotted, pale olive, c. .25 cm. long, pedicel terete c. .25 cm. long.

Singapore, Choa Chu Kang (Corner).

This belongs to the affinity of *B. vesiculosum,* J. J. S. and *B. rigidifilum,* J. J. S. both from Sumatra in which the appendages of the petals are rigid. From the former it differs in the colour of the sepals, the appendages of the petals which in the present plant are larger and do not taper to the apex and in the lip which here is acute and not entirely covered above the base with vesicles.

Bulbophyllum *(§ Epicrianthes)* **abbrevilabium,** sp. nov. Rhizoma pendulum. Pseudobulbi alternati, quadrilateraliter ovoidei, supra complanati, dorso lateribusque concavi, unifolii. Folium ellipticum, obtusum, crasse coriaceum, marginibus valde recurvis. Inflorescentiae e basi pseudobulbi, fasciculatae, vagina pseudobulbi omnino tectae, uniflorae. Sepalum dorsale oblongo-ellipticum, breviter acuminatum, acutum. Sepala lateralia oblongo-ovata, breviter acuminata, acuta. Petala brevissima, super basin biloba, lobis appendices 3-4 lanceolatos anguste obtusos 1-nervios papillosos ferentibus, appendice 1 simili in sinu. Labellum mobile, integrum, ovoideum, subacutum, apicem versus supra subtusque leviter compressum e basi usque apicem fere canaliculatum, marginibus basi in lobum rotundatum dilatatis, lateribus super lobos pulvinum vesiculosum ferentibus super pulvinos puberulis, supra sub apice verrucoso-tumidum. Gynostemium breve, rectum, alis triangularibus obtusis, margine clinandrii dentato.

Rhizome pendulous, sinuous, covered with dry sheaths, basal roots very many appressed to the substratum, upper roots appressed to the rhizome, rarely branched, c. 22 cm. long or longer, .20-.25 cm. diam. Pseudobulbs 1.75-2.50 cm. distant, alternate, forming an acute angle with the rhizome, ovate-oblong or ovoid, distinctly 4-sided, minutely wrinkled, front broad flattened, sides more or less concave, back narrow deeply grooved, covered with an oblong acute dry sheath, olive-green densely suffused red or entirely reddish, 1-1.30 cm. long, front c. .60 cm. wide, sides and back c. .35 cm. wide, 1-leaved. Leaf recurved or horizon-

tally expanded, elliptic, obtuse, thickly coriaceous, stiff, margins more or less strongly recurved, above convex grooved, beneath concave inconspicuously keeled, base strongly twisted, olive-green deeply suffused red or entirely reddish above, olive-green beneath, 3.50-4.25 cm. long, 1.60-2.10 cm. wide, petiole grooved c. .10 cm. long. Inflorescences from base of pseudobulb, fascicled, covered by the sheath of the pseudobulb, 1-flowered, peduncle terete whitish c. .40 cm. long. Bract infundibuliform, produced scurf-dotted on back c. .30 cm. long. Flowers widely expanded, lasting 1 day. Sepals ochreous densely suffused dark red, margins ochreous dotted dark red attenuate angled, reflexed from base. Dorsal sepal oblong-elliptic, shortly acuminate, acute, 5-nerved, outside scurf-dotted, c. .55 cm. long, c. .35 cm. wide. Lateral sepals shortly running down the column foot, oblong-ovate, very shortly acuminate, acute, 5-nerved, outside scurf-dotted, c. .55 cm. long, c. .35 cm. wide. Petals very short, broad, 2-lobed from above the base with a broad sinus between the lobes, rose-pink, apex of lobes diverging curved outwards white, posterior lobe roundly triangular to about the middle then acuminate abruptly curved outwards bearing above the middle 3-4 appendages, anterior lobe shorter triangular curved outwards at about the middle bearing 3-4 appendages in the upper half, an extra single appendage in the sinus of the lobes, appendages stipitate mobile lanceolate narrowly obtuse 1-nerved subequal grey covered with minute dark grey papillae c. .25 cm. long stipes filiform white c. .05-.10 cm. long. Lip stipitate to apex of column foot, mobile, entire, ovoid, subacute, towards apex slightly flattened above and beneath, above grooved to below the apex thence warty tumid, 2 rounded fleshy erect lobes at base with margins produced above to a conspicuous keel reaching to beyond the middle, sides above the basal lobes swollen to a cushion bearing rows of shiny vesicles running obliquely downwards to beyond the middle puberulous a fairly conspicuous puberulous keel running from apex of cushion to apex of lip, beneath transversely grooved at point of insertion swollen above to 2 low rounded gibbi puberulous a median groove from base to below the apex, dark red, c. .27 cm. long, c. .09 cm. diam. Column short, straight, arms triangular obtuse posterior margin irregular, base white, above dark red, c. .09 cm. tall, clinandrium excavate margin toothed, stigma deeply excavate narrow linear narrowed below. Anther oblong, beak convex truncate, pale yellow. Column foot very short, slightly incurved, base fleshy, apex attenuate, white. Ovary 6-grooved, scurf-dotted, c. .50 cm. long, pedicel terete scurf-dotted c. .20 cm. long.

Pahang, Sat river, on *Dipterocarpus oblongifolius*, altitude c. 500 feet.

This plant is of the affinity of *B. mobilifilum,* Carr and *B. papillosofilum,* Carr with mobile petal appendages. It is, however, at once distinguished by its small size and by the curiously abbreviate lip.

Described from living material.

Bulbophyllum *(§ Epicrianthes)* **Haniffii,** sp. nov. Rhizoma pendulum. Pseudobulbi oblongi, quadrilaterales, lateribus leviter concavis, 1-folii. Folium ellipticum, obtusum, crasse coriaceum, marginibus recurvis. Inflorescentiae e basi pseudobulbi, fasciculatae, uniflorae. Sepala lanceolata, acuminata, acuta. Petala brevissima, super basin biloba, super medium appendices 3-4 lineari-lanceolatos obtusos 1-nervios papillosos ferentibus, appendice in sinu 0. Labellum mobile, integrum, ovoideum, super medium abrupte acuminatum, acutum, supra subtusque canaliculatum, marginibus basi in lobum rotundatum erectum carnosum, super lobos basales omnino puberulum, lateribus super lobos in pulvinum vesiculosum dilatatis. Gynostemium rectum, alis triangularibus margine postico ultra medium in dentem triangularem producto, margine clinandrii denticulato.

Rhizome pendulous, sinuous, covered with dry sheaths, c. .20 cm. diam. Pseudobulbs up to c. 2.50 cm. distant, forming an acute angle with the rhizome, oblong, 4-sided, sides slightly concave, wrinkled, covered with large dry sheaths, c. 1.30 cm. long, c. .40 cm. wide, c. .30 cm. thick, 1-leaved. Leaf horizontally spreading, elliptic, obtuse, thickly coriaceous, stiff, margins and apex recurved, above convex grooved, beneath concave keeled, base slightly twisted, c. 4.20 cm. long, up to c. 2.50 cm. wide, petiole grooved c. .05 cm. long. Inflorescences from base of pseudobulb, fasciculate, covered by the sheaths of the pseudobulb, 1-flowered, peduncle terete .40-.50 cm. long. Bract tubular, c. .30 cm. long. Sepals reflexed from base, laterals running to below middle of column foot, lanceolate, acuminate, acute, base 5- above 7-nerved, margins angulate attenuate below apex incurved, scurf-dotted on back, c. .66 cm. long, c. .28 cm. wide. Petals very short, broad, 2-lobed from above the base with an obtuse-angled sinus between, lobes diverging apex slightly curved outwards narrowly triangular outer margins roundly dilate about the middle the posterior lobe bearing 3 the anterior 4 appendages towards the apex posterior c. .06 cm. long c. .02 cm. wide anterior as long but broader, appendages linear-lanceolate obtuse stipitate mobile 1-nerved densely papillose up to c. .30 cm. long, appendage in sinus of lobes 0, stipes of appendages filiform up to c. .06 cm. long. Lip stipitate to apex of column foot, mobile, entire, ovoid, seen from the side abruptly acuminate above the middle, acute, grooved above and beneath for the whole length, 2 rounded fleshy erect

lobes at base with margins produced in front to a conspicuous keel running to about the middle then shortly verrucoso-tumid and evanescent, sides above the basal lobes swollen to a cushion bearing rows of shiny vesicles running obliquely downwards to beyond the middle, beneath at base a transverse groove and above the base 2 low rounded gibbi, basal lobes and gibbi excepted whole lip puberulous, c. .38 cm. long, c. .18 cm. diam. Column short, straight, arms triangular subacute the posterior margin produced beyond the middle to a short triangular tooth, c. .17 cm. tall, clinandrium excavate margins toothed, stigma deeply excavate narrow. Anther ovate with a median oblong boss above, shallowly 2-celled, beak abruptly right-angularly recurved oblong truncate highly convex. Pollinia 4 in 2 pairs, the outer ones of each pair larger, flattened inside, seen from the side ovate acute. Column foot roundly incurved, c. .10 cm. long. Ovary 6-grooved, scurf-dotted, with the terete pedicel c. .37 cm. long.

Pulau Tikus, Penang (Haniff).

This belongs to the group with mobile petal appendages. In the absence of an extra appendage between the petal lobes it agrees with *B. mobilifilum*, Carr but it is in all other respects very distinct from that species. In the structure of the lip it resembles *B. Corneri*, Carr but in that species the petal lobes are rigid and there is an extra appendage in the sinus of the lobes. From *B. epicrianthes*, Hook. f. it differs in the smaller dimensions, the shorter less curved petal lobes and the absence of an extra appendage in the sinus. It is perhaps nearest to *B. abbrevilabium*, Carr from which, however, it differs distinctly in the structure of the sepals and lip and in the absence of an appendage in the sinus of the petal lobes.

Described from material preserved in spirit (A 568).

Bulbophyllum tortuosum, Lndl. Gen. et Sp. Orch. 50; Miq. Fl. Ind. Bat. III, 647; J. J. S. Fl. Buit. VI (Orch.) 450, Atlas No. CCCXLII: *B. Listeri*, King and Pantl. in Ann. Bot. Gard. Calc. VIII, 66, t. 90: *B. indragiriense*, Schltr. in Bull. Herb. Boiss. Sér. 2. vi (1906) 463: *Diphyes tortuosa*, Bl. Bijdr. 311: *Phyllorchis tortuosa*, O. K. Rev. Gen. Pl. II, 678.

Pahang, Sat river on *Dipterocarpus oblongifolius*, altitude c. 500 feet. This is the first record from the Peninsula of this very curious and interesting plant.

Bulbophyllum laxiflorum, Lndl. Gen. and Sp. Orch. 57; Miq. Fl. Ind. Bat. III, 650.; J. J. S. Fl. Buit. VI (Orch.) 433, Atlas No. CCCXXIX.—*Diphyes laxiflora*, Bl. Bijdr. 316.—*Phyllorchis laxiflora*, O. K. Rev. Gen. Pl. II, 677.

Pahang, Fraser Hill on the path to Pine Tree Hill, altitude c. 4,000 feet, March 1929.

Distribution:—Java, Sumatra.

Bulbophyllum taluense, Carr. *B. laxiflorum,* Lndl. *var. taluense,* J. J. S. in Bull. Jard. Bot. Buit. Ser. III. Vol. IX, 170.

Pahang, Kota Glanggi on small trees on limestone ridges, fairly commonly.

I have examined a number of plants of this and am convinced that it is specifically distinct from *B. laxiflorum,* Lndl. In the Kota Glanggi plants the sepals are all clavate-ciliate and sparsely clavate-hairy on the inner surface. The lip is minutely papillose and I can only find 2 keels present one on each side of the median groove. Other than in these points the plants agree very well in habit and structure with Dr. Smith's description.

Distribution:—Sumatra.

Bulbophyllum *(§ Polyblepharon)* **nigropurpureum,** sp. nov. (Plate 2). Rhizoma breve, ramosum. Pseudobulbi approximati, brevissimi, ovoidei vel subglobosi, 1-folii. Folium breve ovatum vel obovatum aut productum anguste obovatum vel oblongo-obovatum, acutum ve minute cuspidatum. Inflorescentiae e basi pseudobulbi, fasciculatae ad 10 vel plures, 1-florae. Bractea infundibuliformis. Flos valde expansus sepalis e basi reflexis. Sepalum dorsale oblongum, breviter acuminatum acute apiculatum, marginibus apicem versus incurvis minute ciliatis, intus minute papillosum, extus rare furfuraceo-punctatum. Sepala lateralia margine antico omnino fere adnata, apice ipso libero acute apiculato, margine postico apicem versus leviter incurvo minute ciliato, intus basi margines prope excepto minute papillosa, extus sparse furfuraceo-punctata. Petala subfalcata, anguste ovata vel ovato-lanceolata, acuta, saepe inaequalia, marginibus super medium incurvis breviter ciliatis. Labellum mobile, 3-lobum, inter lobos laterales in callum conicum truncatum elevatum callo in carinam usque ad apicem attingentem nitidam producto carina brevi utraque calli parte addita; lobi laterales breves, lati, rotundati, margine postico super basin in lobulum breven incurvum producto, margine antico ciliato; lobus intermedius oblanceolatus, acutus, marginibus clavato-ciliatis. Gynostemium breve, stelidiis subulatis margine postico papilloso.

Rhizome short, not appressed to the substratum, densely rooting the roots reaching downwards to the substratum and appressed to it. Pseudobulbs approximate, small, ovoid or subglobose, green, up to c. .20 cm. long, c. .15 cm. wide,

1-leaved. Leaf short ovate or obovate or elongate narrowly obovate or oblong-ovate, acute or minutely cuspidate, rather fleshy, coriaceous, above grooved green or dark grey-green sometimes suffused red towards the base, beneath inconspicuously keeled paler, up to c. 4 cm. long, c. 1.25 cm. wide, base twisted, petiole grooved up to c. .30 cm. long. Inflorescences from tufts of dry sheaths at base of pseudobulb, fascicled, up to 10 or more, 1-flowered, peduncle terete thickened upwards warty and sparsely furfuraceo-punctate whitish suffused dull purple up to c. 2.25 cm. long. Bract short, funnel-shaped, shortly acutely apiculate, whitish, c. .20 cm. long. Flower widely expanded. Sepals strongly reflexed from c. 1/4 above the base, whitish at base, dark purple-black above. Dorsal sepal oblong, shortly acuminate, acutely apiculate, 5-nerved, margins towards apex incurved minutely ciliate, inside minutely papillose, outside sparsely furfuraceo-punctate, c. .62 cm. long, c. .25 cm. wide. Lateral sepals adnate for nearly their whole length, tips only free acutely apiculate, together forming an ovate-lanceolate minutely bidentate blade, 3-nerved, posterior margin towards apex slightly incurved minutely ciliate, inside minutely papillose except at base near the margins, outside sparsely furfuraceo-punctate, together c. .55 cm. long, c. .35 cm. wide. Petals subfalcate, narrowly ovate or ovate-lanceolate, acute, 1-nerved, margins in upper half slightly incurved shortly ciliate, often subpelorically unequal, base whitish, above base black-purple, towards apex dark black-purple, posterior margin sometimes white, .37-.45 cm. long, c. .20 cm. wide. Lip adnate to the apex of the short column foot, mobile, 3-lobed, base fleshy remainder thin, a short conic truncate callus between the side lobes ending in a shiny black keel running to the apex of the lip and a short rather tall narrow keel on each side of the callus, 3-nerved, slightly convex above, beneath highly convex at base remainder slightly concave with a median keel to near apex, c. .35 cm. long, c. .09 cm. wide; side lobes short broad, rounded, papillose in anterior half, posterior margin produced above base to a short incurved obtuse lobule, anterior margin ciliate; midlobe oblanceolate, acute, minutely papillose, margins clavate-ciliate, c. .28 cm. long, c. .09 cm. wide, basal lobules of side lobes whitish remainder dark purple almost black. Column short, stout, cream, c. .08 cm. tall, stelidia subulate upper margin paipllose, cream tipped black-purple c. .07 cm. long, stigma large subquadrate, rostellum triangular truncate 2-toothed. Anther ovate, grooved inside, conspicuously clubbed and papillose above with a papillose keel reaching to the apex, yellowish white. Pollinia yellow. Column foot very short, broad, cream with a dark red spot near the apex, c. .03 cm. long. Ovary 6-ribbed, furfuraceo-punctate, c. .13 cm. long. Capsule

obovoid, rounded above, flattened beneath, crowned by the withered remains of the flower, c. .80 cm. long, c. .38 cm. diam.

Pahang, Sat river at an altitude of about 400 feet.

This is the first species of the section *Polyblepharon* to be found in the Peninsula. The petals show signs of peloric development and it is a very interesting fact that plants are occasionally found producing flowers with 3 anthers. In such cases the stelidia of the column are absent or reduced to short wings, the lateral anthers being attached to the apex of the anterior margins below the rostellum and opposite the stigma and self-pollination results. The reduction of one or both petals often occurs in perfectly normal flowers.

Described from living plants.

Bulbophyllum *(§ Monilibulbum)* **malleolabrum**, sp. nov. . Rhizoma breve, repens, multi-ramosum. Pseudobulbi approximati vel subapproximati, procumbentes, rhizoma omnino circumdantes, supra visi ovoidei vel elliptici, glabri, nitidi, 1-folii. Folium ovatum, obtusum minuteve inaequaliter bilobum. Inflorescentiae e basi pseudobulbi, fasciculatae, 1-florae. Bractea infundibuliformis. Sepalum dorsale oblongo-lanceolatum, acutum, marginibus dimidio basali irregularibus super medium minute denticulatis, nervis extus valde elevatis papillosis. Sepala lateralia oblongo-elliptica, acuta, marginibus super medium minute denticulatis, nervis extus elevatis papillosis. Petala oblongo-elliptica, acuta, subfalcata. Labellum mobile, 3-lobum, lobis lateralibus triangularibus obtusis papillosis basi erectis super basin abrupte recurvis ad latera adpressis basin labelli superantibus, lobo intermedio obovato retuso dense verrucoso supra valde convexo. Gynostemium brevissimum, stelidiis triangularibus longe acuminatis acutis, pede sub stigmate in gibbum magnum humilem dilatato.

Rhizome short, creeping, much branched, emitting 1-3 roots from below each pseudobulb. Pseudobulbs approximate or subapproximate, alternate, ovoid or elliptic, flattened above, lying flat on the rhizome and entirely surrounding and concealing it beneath, apex very shortly free and slightly curved outwards, .20-.45 cm. long, .15-.30 cm. across, .08-.15 cm. thick, 1-leaved. Leaf ovate, obtuse or minutely unequally bidentate, horizontally spreading, grooved above, keeled beneath, .20-.40 cm. long, .15-.30 cm. wide, petiole minute grooved. Inflorescences from base of pseudobulb, fascicled, more or less erect, 1-flowered, peduncle very slender filiform slightly thickened towards the apex sheathed at base .60-1.30 cm. long. Bract funnel-shaped, c. .20 cm.

long. Upper sepal oblong-lanceolate, acute, 3-nerved outer nerves branched, margins irregular in basal half minutely toothed above the middle, inside concave, outside convex the nerves strongly elevate papillose, c. .45 cm. long, c. .18 cm. wide. Lateral sepals running almost to apex of column foot, oblong-elliptic, acute, 3-nerved outer nerves branched, posterior margin a little dilate above base, margins minutely toothed above the middle, inside concave, outside convex the nerves elevate papillose, c. .53 cm. long, c. .28 cm. wide. Petals oblong-elliptic, acute, subfalcate, 1-nerved, c. .17 cm. long, c. .08 cm. wide. Lip adnate to apex of column foot, mobile, 3-lobed, spread out c. .20 cm. long, across side lobes c. .17 cm. wide; side lobes large, triangular, obtuse, base erect, above the base abruptly reflexed appressed to the sides and exceeding the base of the lip, minutely papillose towards the apex, 2 tall narrow parallel keels above running from the posterior marin at the bend to the middle of the lip there shortly sinuate and abruptly terminated; midlobe obovate, retuse, highly convex, margins strongly recurved, base excepted entirely verrucose-papillose. Column very short, continuing the ovary, c. .05 cm. long, stelidia porrect subsigmoidly curved triangular long-acuminate acute c. .08 cm. long. Column foot linear, fleshy, very slightly incurved towards the apex, a large low gibbus inside at base below the stigma, c. .10 cm. long. Ovary 6-ribbed, verrucose and furfuraceo-punctate, c. .10 cm. long, pedicel filiform c. .75 cm. long.

Pahang, Cameron Highlands, altitude c. 4,600 feet, April, 7th 1930, No. A.458 and 23474 (M. R. Henderson). " Sepals pale orange, darker towards base, upper one slightly darker with faint veins. Petals dark reddish orange. Lip reddish purple, tip papillose."

A curious species with a very distinct lip structure. The large triangular side lobes are abruptly decurved from above the base and appressed to the sides of the lip the apex protruding well below the under surface of the lip.

Described from spirit material No. A 458.

Bulbophyllum *(§ Monilibulbum)* **carunculaelabrum,** sp. nov. Rhizoma repens, ramosum. Pseudobulbi approximati, alternati, dorso compressi, a dorso visi oblongi ve suborbiculares, 1-folii. Folium ovatum, acutum. Inflorescentiae 1-florae. Bractea infundibuliformis. Sepalum dorsale ellipticum, acutum. Sepala lateralia late elliptica vel suborbicularia, acuta. Petala brevissima, oblongo-elliptica, obtusa. Labellum mobile, 3-lobum, inter lobos laterales in lamellis 2 triangularibus marginibus erosulis conspicue elevatum; lobi laterales triangulares subacuti, basi erecti, super basin abrupte recurvi et ad latera

adpressi; lobus intermedius transverse oblongus, subretusus, valde convexus, carunculato-tumidus. Gynostemium breve; stelidia triangularia, acuminata, acuta; pes gynostemii linearis, apicem versus leviter incurvus, gibbo magno sub apice ornatus.

Rhizome creeping, branched, rooting from below the pseudobulbs. Pseudobulbs approximate, alternate, lying flat on the rhizome and entirely surrounding it beneath except below the apex, strongly flattened above, seen from above oblong or suborbicular, minutely wrinkled, yellow-green, .15-.38 cm. long, about as broad, .06-.1 cm. thick, 1-leaved. Leaf horizontally and outwards spreading, ovate, acute, grooved bright green above, keeled paler beneath, .15-.40 cm. long, .12-.30 cm. wide, petiole minute. Inflorescences from base of psedobulb, erect or suberect, 1-flowered, peduncle terete with some tubular sheaths at base pale greenish c. .90 cm. long. Bract funnel-shaped, pale greenish, c. .20 cm. long. Dorsal sepal porrect continuing the ovary, elliptic, very shortly acuminate, acute, 3-nerved outer nerves branched, margins minutely toothed above middle, inside deeply concave, outside highly convex nerves elevate verrucoso-papillose, semitransparently pale ochre darker towards apex reddish towards base, margins red, nerves bright orange-ochre, c. .35 cm. long, c. .25 cm. wide. Lateral sepals running to beyond middle of column foot, subhorizontally or obliquely expanded, broadly elliptic or suborbicular, acute or elevate in a small conic apiculus, 5-nerved outer nerves sometimes branched, flat, margins thin in texture rather recurved minutely toothed in upper half, inside sparsely warty, outside nerves elevate verrucoso-papillose, yellow-ochre, pale orange-ochre at base, c. .48 cm. long, c. .42 cm. wide. Petals very small, oblong-elliptic, obtuse, base a little narrowed, red, margins and apex darker, c. .12 cm. long, c. .07 cm. wide. Lip adnate to apex of column foot, mobile, 3-lobed, grooved between the side lobes with a short erect triangular rather erose lamella on each side at apex of groove, nearly straight, dark red, spread out c. .20 cm. long, c. .30 cm. wide across the side lobes; side lobes triangular, subacute, base erect, above base abruptly and strongly decurved appressed to the sides and exceeding the under surface of the lip; midlobe abruptly elevate, strongly convex, margins and apex strongly recurved, spread out transversely oblong subretuse, entirely carunculato-tumid, margins contiguous beneath the lip. Column short, forming an obtuse angle with the ovary, stelidia porrect triangular acuminate acute slightly curved reaching to apex of petals, red, in all c. .12 cm. long. Pollinia seen from the side more or less triangular, strongly flattened, minutely wrinkled, pale yellow. Column foot

stout, linear, fleshy, straight to below apex then slightly incurved, base convex with a conic gibbus below the stigma green densely dotted red, incurved part concave, apex very slightly dilate subretuse red, c. .08 cm. long. Ovary abruptly clavate-dilate, 6-ribbed, sparsely warty, not furfuraceous, green, c. .09 cm. long, pedicel terete whitish suffused pale orange-red c. .60 cm. long.

Johore, Sedili river, on trunks of a *Pandanus* at sea level (Corner).

It is interesting that the nearest ally of this plant is *B. malleolabrum*, Carr from an altitude of about 4,600 feet. In habit the plants closely resemble each other but there are distinct differences in the structure of the parts of the flowers hardly reconcilable, I think, to intra-specific variation. In *B. carunculaelabrum*, Carr the sepals are shorter and much broader, the petals very obtuse and the lip presents several distinct differences. The conspicuous keels of *B. malleolabrum*, Carr are represented in the present plant by triangular lamellae, the side lobes of the former are minutely papillose while in the latter they are glabrous. The midlobe of the present plant is abruptly elevate and carunculato-tumid whereas in *B. malleolabrum*, Carr it is conspicuously papillose. The ovary of the present plant is not furfuraceous.

Described from living plants.

Bulbophyllum ovalifolium, Lndl. Gen. and Sp. Orch. 49; Miq. Fl. Ind. Bat. III, 647; J. J. S. Fl. Buit. VI (Orch.) 455, Atlas No. CCCXLVII.—*B. parvulum* Lndl. l. c.; Miq. l. c. 646.—*Diphyes ovalifolia*, Bl. Bijdr. 318.—*D. pusilla* Bl. l. c. 317.—*Phyllorchis ovalifolia*, O. K. Rev. Gen. Pl. II, 677.—*P. parvula*, O. K. l. c.

Pahang, Fraser Hill on a felled tree by the road to Pine Tree Hill, altitude c. 4,000 feet. This was found in March 1929 and it is the only record from the Peninsula. I have not found it since.

Distribution:—Java.

Bulbophyllum xylocarpi, J. J. S. in Bull. Jard. Bot. Buit. Ser. 3. Vol. IX. Liv. 1-2, 48. t. 7. II.

Singapore Choa Chu Kang (E. J. H. Corner). Distribution:—Java.

Bulbophyllum *(§ Micromonanthe)* **diplantherum**, sp. nov. . Rhizoma repens, ramosum. Pseudobulbi ad c. .80 cm. dissiti, ad rhizoma adpressi oblongi subglobosive, subtus sub apice canaliculati, 1-folii. Folium ovato-ellipticum vel ovato-oblongum, apice minute bidentato, pedicello 0. Inflorescentiae e basi pseudobulbi, erecti, 2-florae, pedunculo

terete. Bracteae lanceolatae, acutae. Flores vix expansi, pallide virescentes. Sepalum dorsale anguste ovatum, longe acuminatum, acutum. Sepala lateralia e basi triangulari-ovata longissime acuminata, acuta, margine antico basi sensim dilatato. Petala oblonga, anguste obtusa, super medium marginibus minute erosulis. Labellum mobile, integrum, lanceolatum, obtusum, omnino papillosum. Gynostemium rectum, stelidiis triangularibus sub apice incurvis acuminatis acutis.

Rhizome creeping, branched, terete, sparingly rooting from below the pseudobulbs, c. .07 cm. diam. . Pseudobulbs up to c. .80 cm. distant, lying flat on the rhizome and more than half embracing it beneath, apex very shortly recurved grooved beneath, oblong or subglobose, sometimes more or less 4-sided when old with the sides concave, shiny pale green or pale yellow-green, .40-.60 cm. long, .30-.45 cm. wide, .15-.30 cm. thick, 1-leaved. Leaf suberect or horizontally spreading, ovate-elliptic or ovate-oblong, apex minutely bidentate, above grooved rather shiny dark green, beneath keeled dull paler, base twisted, .50-1.15 cm. long, .35-.60 cm. wide, petiole 0. Inflorescences from the base of the pseudobulb, erect, 2-flowered, peduncle terete pale green c. .80 cm. long. Bracts thin, membraneous, lanceolate, acute, transparently pale greenish, c. .27 cm. long, c. .12 cm. wide. Flowers not widely expanded, lip uppermost, pale greenish, c. 1 cm. long. Dorsal sepal forming a very obtuse angle with the ovary, narrowly ovate, acuminate from about the middle, acute, 3-nerved, inside concave, outside convex keeled, c. .46 cm. long, c. .14 cm. wide. Lateral sepals running to beyond the middle of the column foot, divergent, very long-acuminate from the narrowly triangular-ovate base, apex acute, anterior margin distinctly roundly dilate at base, 3-nerved, inside concave, outside convex keeled, c. 1 cm. long, c. .15 cm. wide at base. Petals oblong, narrowly obtuse, 1-nerved, margins above the middle minutely erose, c. .14 cm. long, c. .07 cm. wide. Lip adnate to apex of column foot, mobile, entire, 3-nerved, slightly recurved about the middle, entirely papillose, above slightly concave at base convex above, beneath highly convex along the median line concave towards the margins, c. .15 cm. long, c. .07 cm. wide. Column fairly stout, straight, stelidia triangular incurved and acuminate towards the acute apex, in all c. .10 cm. tall. Anther conic, seen from above suborbicular or when spread out reniform, bilobed, grooved above. Pollinia triangular-pyriform, flattened inside, the inner ones smaller. Column foot linear, narrowed towards apex, roundly incurved towards apex, c. .10 cm. long. Ovary 6-grooved, very sparingly furfuraceo-punctate, c. .10 cm. long, pedicel very short terete c. .05 cm. long.

Pahang, Cheka river at an altitude of about 300 feet. I have provisionally included this plant in the section *Micromonanthe* since, apart from the 2-flowered inflorescence, it is similar in habit to many species at present included in that group. From the short description it might be an ally of *B. tenerum,* Ridl. but there is unfortunately no material of that plant in Singapore.

Bulbophyllum tenuifolium, Lndl. Gen. and Sp. Orch. 50; Miq. Fl. Ind. Bat III, 648; J. J. S. Fl. Buit. VI (Orch.) 462, Atlas No. CCCLIII.—*Diphyes tenuifolia,* Bl. Bijdr. 316.—*Phyllorchis tenuifolia,* O. K. Rev. Gen. Pl. II, 678.

Singapore, Chua Chu Kang on mangrove (Corner). In the Singapore plants the petals are papillose and the flowers are rather larger than in Dr. Smith's description l. c. . *B. vitellinum,* Ridl. is very closely allied to this

Distribution:—Java.

Bulbophyllum ciliatum, Lndl. Gen. and Sp. Orch. 48; Miq. Fl. Ind. Bat. III, 646; J. J. S. Fl. Buit. VI. (Orch.) 457, Atlas No. CCCXLIX.—*Diphyes ciliata,* Bl. Bijdr. 317.—*Phyllorchis ciliata,* O. K. Rev. Gen. Pl. II, 677.

Pahang, Cameron Highlands, altitude c. 4,500 feet, Nos A 457 and 23435, April 5th, 1930 (M. R. Henderson). "Flowers deep reddish pink, base of sepals and petals white."

In the Cameron Highlands plant the leaves, sepals and petals are shorter than usual while the stelidia of the column possess a distinct tooth on the anterior margin just below the middle.

This is a plant new to the Peninsula.

Distribution:—Java.

Bulbophyllum uniflorum, Hassk. **var. variebile,** Carr; *B. variebile,* Ridl. in Journ. Roy. As. Soc. Str. Br. 39, p. 74; Fl. Mal. Pen. IV. 59.

B. uniflorum, Hassk. is an extremely variable plant in regard to colour and the dimensions of the parts. I can find no structural characters by which *B. variebile,* Ridl. can be kept distinct, nor does it differ in habit. In colour it is, howevere, very distinct and should be maintained as a variety. The sepals and petals are yellow with lines of red streaks and spots while the lip is yellow densely spotted red. The column is also yellow with red dots.

var. rubrum, Carr; *B. variebile,* Ridl. *var. rubrum,* Ridl. Fl. Mal. Pen. IV. 59.

This again, as far as I can see, can only be maintained as a colour variety. The sepals and petals are reddish

spotted dark red at base. The lip is dark crimson. The column is yellow spotted red with the short stelidia crimson.

var. pluriflorum, Carr, var. nov. . Rhizome long-creeping, covered with dry sheaths, c. .30 cm. diam., internodes 1.30-2 cm. long slightly thickened at the nodes. Pseudobulbs up to c. 17 cm. distant, cylindric, curved, laterally flattened, many-grooved, green, c. 7.50 cm. long, c. 1.30 cm. wide, c. .60 cm. thick, 1-leaved. Leaf oblong or ovate-oblong, shortly acuminate, acute, 14-22 cm. long, 4.70-8.25 cm. wide. Inflorescence from base of pseudobulb, erect, c. 5-flowered, peduncle fairly stout with c. 3 short tubular sheaths at base and c. 3 at intervals in the lower half c. 9 cm. long c. .25 cm. diam., rachis c. 1.30 cm. long. Bracts oblong, shortly rather abruptly acuminate, acute, 7-nerved, outside highly convex scurf-dotted, inside concave, c. 1.10 cm. long, c. .68 cm. wide. Dorsal sepal oblong-lanceolate, acute, 5-nerved or sub-7-nerved nerves branched, margins incurved towards apex, outside convex scurf-dotted, inside concave especially towards the apex, c. 3.80 cm. long, c. 1.16 cm. wide. Lateral sepals adnate to column foot for 1.25 cm. and not reaching to apex, falcate, triangular-ovate, acuminate from about the middle, apiculate apiculus conic acute, 5- or sub-7-nerved nerves branched, posterior margin acutangularly incurved from about the middle, anterior margin incurved near the apex, outside scurf-dotted inconspicuously keeled basal half convex on posterior side concave on anterior side of median nerve apical half highly convex, c. 3.60 cm. long, c. 1.68 cm. wide. Petals falcate, triangular-oblong, acuminate from above the middle, very acute, 5-nerved inner nerves few-branched, inside slightly concave, outside slightly convex, c. 1.80 cm. long, c. .75 cm. wide. Lip adnate to apex of column foot, mobile, cordate, acuminate, acute, fleshy, abruptly decurved about the middle the apical portion grooved above forming less than a right angle with the base, basal portion flattened above, c. 5-nerved nerves branched, basal lobes rounded very fleshy the posterior margin twisted at base, a short oblique keel from the anterior margin running to the sinus between the lobes, margins much thickened, a small very inconspicuous conic tubercle above at the bend, beneath convex with a narrow median groove, stipes linear 3-nerved dilate at the junction with the lip, the whole c. 2 cm. long, c. 1.10 cm. wide, basal lobes c. .40 cm. long and as wide, stipes c. .25 cm. long. Column short with a broad rounded keel on back, arms triangular with a short broad triangular stelidium on the anterior margin opposite the stigma, including the arms c. .35 cm. long, clinandrium deeply excavate semilunate, stigma flask-shaped. Anther broadly and roundly conic with a median keel-like boss above, seen from above

suborbicular, grooved on back, apex produced to a very short rounded toothed beak, 2-celled, nearly .20 cm. tall and about as wide. Pollinia 4, in 2 pairs, flattened, outer one of each pair cordate-triangular c. .10 cm. long c. .09 cm. wide, inner one slightly smaller triangular. Column foot long, linear, narrowing gradually from base to apex, a broad low median keel inside, apical portion free for about .55 cm. and about rightangularly incurved, free part keeled on back, in all c. 1.20 cm. long, c. .50 cm. wide at base. Ovary 6-grooved, c. .70 cm. long, pedicel terete c. 2.20 cm. long.

Pahang, Cameron Highlands, c. 4,600 feet, April 10th, 1930, No. 23651 and A 466 (M. R. Henderson). "Sepals yellowish tinged red-pink. Petals spotted deep red-purple. Lip mobile, reddish-orange with darker spots. Foetid odour. 5 flowers in inflorescence."

B. uniflorum, Hassk. usually produces inflorescences with 1 or 2 flowers. In the present case the inflorescence is 5-flowered but apart from this and certain small variations in the lip such as the basal keels and the inconspicuous tubercular swelling at the bend I can find no characters either of habit or structure by which it can be distinguished specifically from *B. uniflorum,* Hassk. . In colour the present variety appears to come between *var. variebile,* Carr and *var. rubrum,* Carr.

Described from dried material and a flower preserved in spirit.

Bulbophyllum *(§ Cirrhopetalum)* **chekaense,** sp. nov. . Rhizoma repens, pauciramosum. Pseudobulbi approximati vel subapproximati, quadrilateraliter ovoidei, 1-folii. Folium oblongum vel oblongo-oblanceolatum rare lineare, obtusum. Inflorscentia e basi pseudobulbi, erecta, 2-flora. Bracteae ad pedicellum adpressae, ovatae, acute apiculatae. Sepalum dorsale oblongo-obovatum, apici in gibbum minutum rotundatum productum. Spala lateralia basi unguiculata, ungue elliptica lamina super unguem valde torta lanceolata brevissime acuminata anguste obtusa, margine postico super unguem usque ad apicem connato apice ipso libero. Petala brevissima, falcata, oblonga, apici in dentem brevem subulatum producta. Labellum mobile, integrum, ligulatum, acuminatum, obtusum. Gynostemium breve, rectum, alis bidentatis margine antico leviter dilatato. Anthera ovata, obtusa, apicem versus minute papillosa.

Rhizome creeping, few-branched, densely rooting, covered with dry sheaths, .10-.20 cm. diam. . Pseudobulbs approximate or up to c. .50 cm. distant, quadrilaterally ovoid, apex narrow, often curved, sides concave, shiny bright green or yellow-green, 1-2.50 cm. long, .75-1.25 cm. diam., 1-leaved. Leaf oblong or oblong-oblanceolate rarely linear, obtuse, base narrowed twisted, above grooved some-

times obtus-angularly concave bright green or yellow-green sometimes shiny, beneath keeled sometimes obtusangularly convex duller in colour, 3.50- 7 cm. long, 85-2.25 cm. wide, petiole grooved up to c. .20 cm. long. Inflorescence from base of pseudobulb, erect, 2-flowered, peduncle terete dilate towards apex, c. 1.65 cm. long. Bracts appressed to pedicel, ovate, acutely apiculate, inside concave, outside, convex strongly keeled furfuraceo-punctate, c. .28 cm. long, c. .17 cm. wide. Dorsal sepal recurved from base, oblong-obovate, apex produced to a minute rounded point, 5-nerved nerves few-branched, margins entire, inside concave, outside highly convex to below apex, pale yellowish with 5 dull pink lines inside and minutely dotted dull pink, c. .45 cm. long, c. .28 cm. wide. Lateral sepals running to about the middle of the column foot, base clawed elliptic c. .30 cm. long c. .25 cm. wide, twisted at apex of claw bringing the outside of the blade uppermost, blade lanceolate very shortly acuminate narrowly obtuse, 5-nerved nerves branched, anterior margin of blade recurved conspicuously acutangularly recurved towards apex, posterior margin connate from above the claw with the actual apex only free, pale yellowish darker towards the apex minutely dotted dull pink outside (the upper surface), c. 3 short interrupted dark rose-purple streaks inside at base towards the posterior margin, including the claw c. 1.40 cm. long, c. .37 cm. wide across the blade. Petals very small, falcate, oblong, apex produced to a short subulate tooth, 3-nerved, anterior margin a little dilate at base, pale yellowish with 3 interrupted dull rose-purple streaks and some rose-purple dots, c. .18 cm. long, c. .10 cm. wide. Lip adnate to apex of column foot, mobile, entire, ligulate, acuminate, obtuse, roundly recurved from base, margins erect at base rather recurved above, 5-nerved, above grooved at base convex above base, beneath convex grooved, sides rather concave, yellowish minutely dotted brown-purple, spread out c. .275 cm. long, c. .11 cm. wide. Column short, straight, forming an obtuse angle with the ovary, arms bidentate anterior margin rather dilate, pale yellowish minutely dotted rose-purple, c. .09 cm. tall. Anther ovate, obtuse, minutely papillose towards apex, yellow-green, c. .07 cm. long, c. .05 cm. wide. Pollinia not seen. Column foot linear, roundly incurved, apex dilate to 2 distinctly diverging lobules, pale yellowish minutely dotted rose-purple, c. .25 cm. long. Ovary 6-grooved, furfuraceo-punctate, c. .28 cm. long, pedicel terete c. .48 cm. long.

Pahang, Cheka river, altitude c. 300 feet, on *Saraca* trees on the banks.

A rather distinct species with short 2-flowered inflorescences, quite glabrous flowers and very much reduced petals.

Described from living plants, flowers preserved in spirit and colour notes.

Bulbophyllum fenestratum, J. J. S. in Bull. Dép. Agr. Ind. Néerl. XIII (1907), 48. Kelantan, Gua Musang on a small tree at the foot of the limestone cliffs. This is the first reported occurence of this plant in the Peninsula.

Distribution:—Java and Borneo.

Bulbophyllum *(§ Cirrhopetalum)* **cyclosepalon,** sp. nov. . Rhizoma longerepens. Pseudobulbi 8-14 cm. dissiti, quadrilateraliter conici, lateribus concavis, 1-folii. Folium oblongo-lanceolatum, minute retusum, crasse carnosum. Inflorescentia e basi pseudobulbi, ad c. 14-flora. Bracteae e basi lineari lanceolatae, acuminatae, acutae. Sepalum dorsale orbiculare, retusum sinui in setam productum, marginibus basi excepto irregulariter dentatis. Sepala lateralia basi oblonga, deinde torta, lamina oblonga breviter acuminata mucroniformiter apiculata, margine antico reflexo postico e flexu usque sub apice connato. Petala falcata, oblonga, apice truncato longe dentato in setam producto, marginibus basi excepto irregulariter dentatis, dimidio superiore dense papillosa. Labellum mobile, integrum, basi oblongum erectum, deinde recurvum angustatum lineare breviter acuminatum subobtusum. Gynostemium breve, rectum, alis rotundatim dilatatis apice in stelidium bilobulum productis lobulo antico torto triangulari acuto lobulo postico longiore subulato. Anthera conica, supra visa oblonga, rostro brevi rotundato in dentes c. 5 subulatos producto.

Rhizome long-creeping, covered with dry sheaths, rooting from the pseudobulbs, .27-.35 cm. diam., internodes 1-2 cm. long. Pseudobulbs 8-14 cm. distant, erect, quadrilaterally conic, sides concave, at first covered with membraneous sheaths which soon dry and break up into fibres, shiny, bright green, 2.25-3.50 cm. long, 1-1.50 cm. diam., 1-leaved. Leaf oblong-lanceolate, minutely retuse, rather thickly fleshy, coriaceous, apex a little recurved, above conspicuously grooved shiny bright green, beneath fairly conspicuously keeled paler, 8.50-9.75 cm. long, c. 3.50 cm. wide, petiole short stout twisted grooved 1-1.50 cm. long. Inflorescence from base of pseudobulb, up to about 14-flowered or more; peduncle terete, dilate towards apex, some tubular sheaths at base and c. 4 at intervals above, upper sheaths tubular in basal half free part abruptly dilate at base then arched strongly convex keeled apex acute pale green, uppermost sheath quite free broadly lanceolate or ovate acuminate acute, green, dotted dull olive except at base, up to c. 20 cm. long; rachis reflexed, very short conic,

c. .30 cm. long. Bracts lanceolate from a linear base, acuminate, acute, furfuraceous, 5-nerved, irregularly margined, inside deeply concave, outside highly convex, pale green with darker nerves, lower ones longest c. .70 cm. long, c. .27 cm. wide. Upper sepal orbicular, retuse with a dark purple seta c. .20 cm. long in the sinus, 5-nerved, outside cucullately convex minutely papillose, inside, deeply concave, margins irregularly toothed except at base shinily greenish-ochre spotted dark crimson especially towards apex, margins dark red, c. .50 cm. long and as broad. Lateral sepals running to about the middle of the column foot, oblong in the basal 1/4, then abruptly obtusangularly curved and twisted, blade oblong shortly acuminate mucroniformly apiculate, 5-nerved, posterior margin connate from the bend to c. .30 cm. below the apex, anterior margin reflexed pale rose-purple, pale straw colour base darker, inside concave minutely wrinkled spotted dull rose-purple in basal 1/3, outside sparsely papillose entirely spotted pale rose-purple, scarcely 2 cm. long, c. .50 cm. wide. Petals falcate, oblong, apex truncate long-toothed with a black seta c. .10 cm. long, 3-nerved, margins irregularly toothed except at base, densely papillose in upper half, shiny greenish ochre spotted dark red especially towards the black apex, including the seta nearly .50 cm. long, c. .18 cm. wide. Lip adnate to apex of column foot, mobile, entire, strongly recurved above the middle, basal 1/4 erect oblong concave inside, then abruptly narrowed linear shortly acuminate subobtuse, beneath deeply grooved to below apex margins concave, pale yellowish spotted dark red, c. .25 cm. long, c. .10 cm. wide. Column short, straight, pale yellow spotter red especially below, wings porrect parallel roundly dilate whitish sparsely dotted red produced above to a bilobed stelidium anterior lobe twisted incurved triangular acute posterior lobe much longer erect curved subulate, without stelidia c. .18 cm. long, stelidia c. .07 cm. long, clinandrium excavate, stigma deeply excavate narrowly oblong. Column foot linear, incurved, beneath grooved towards the dilate apex, yellowish densely spotted red, as long as or a little longer than the column. Anther conic, seen from above oblong, 2-celled, grooved at base, produced at apex to a short rounded beak with about 5 long subulate teeth, yellow, c. .08 cm. long. Pollinia 4 cohering in 2 triangular-pyriform bodies flattened inside. Ovary 6-grooved, sparsely furfuraceo-punctate, yellow-green densely spotted dark red, c. .55 cm. long, pedicel terete similarly coloured c. .65 cm. long.

Pahang, Chigar Perah at Gua Tipus, climbing up the trunk of a species of *Pandanus* on the limestone cliffs, altitude c. 400 feet.

This has the habit of *B. fenesratum*, J. J. S. but the flowers are very different.

Described from living material.

Trichotosia Teysmannii, Kränzlin in Pflanzenreich IV, 50, II B, 21 (1911) p. 145. *Eria Teysmannii*, J. J. S. in Bull. Dep. Agr. Ind. Néerl. XXII (1909), 29.

Pahang, Sat River at an altitude of c. 350 feet. A large species with trailing stems often over 6 feet long and long lax inflorescences. A new record for the Peninsula.

Cymbidium chloranthum, Lndl. in Bot. Reg. (1843) Misc. 68; in Journ. Linn. Soc. III, 29: *C. sanguinolentum*, T. & B. in Tijdschr. Ned. Ind. XXIV (1862), 318; J. J. S. in Fl. Buitenz. VI (Orch.), 479; Atlas no. CCCLXV.

Pahang, Tembeling.

Distribution:—Java.

Thelasis succosa, sp. nov. Rhizoma repens, ramosum. Pseudobulbi subapproximati vel ad. .70 cm. dissiti, decumbentes, supra visi triangulares, sub apice conico-elevati, 1-folii. Folium lineari-lanceolatum subacutum, carnosum, succosum, sectione transversa semiorbiculare orbiculareve, vagina cylindrica carnosa succosa. Inflorescentiae e rhizomate inter pseudobulbos ortae, dense multiflorae. Bracteae triangulares. Flores haud expansi. Sepalum dorsale triangulari-oblongum, alte conico-apiculatum. Sepala lateralia subfalcate lanceolata, obtusa, sectione transversa triangularia. Petala spathulata, obtusa. Labellum inconspicue 3-lobum, lobis lateralibus brevissimis rotundatis, lobo intermedio subquadrato. Gynostemium breve, marginibus clinandrii antice in lobum triangularem productis, rostello magno triangulari apici bidentato.

Rhizome creeping, branched, covered with dry tubular sheaths, up to c. .45 cm. diam. Pseudobulbs subapproximate to .70 cm. distant, lying flat upon the rhizome and almost entirely embracing it, seen from above triangular with obtuse angles, rather abruptly conic-elevate below the apex, succulent, covered at first with some fleshy tubular sheaths the upper one entirely covering the pseudobulb and produced upwards well above the leaf sheath c. 2.25 cm. long, wrinkled and covered with the brown or silvery grey remains of the upper sheath and surmounted by the dry persistent leaf sheath when old, green, c. 1.50 cm. long, c. 1 cm. wide, c. .70 cm. tall, 1-leaved. Leaf narrowly linear-lanceolate, subacute, very fleshy and succulent, suborbicular to orbicular in transverse section, inside deeply concave grooved often rather wrinkled rather shiny

bright green, outside highly convex rounded opaque grey-green, up to c. 14 cm. long, up to c. 1 cm. wide, sheath very fleshy cylindric with the internal cavity minute succulent .40-.60 cm. long. Inflorescence from the rhizome between the pseudobulbs, erect, many-flowered, peduncle terete pale green up to c. 12 cm. long. Bracts triangular. Flowers not expanded, c. .30 cm. long. Sepals verrucose outside. Dorsal sepal triangular-oblong, highly conic-apiculate, 1-nerved, deeply concave inside towards the apex, whitish, c. .27 cm. long, c. .12 cm. wide. Lateral sepals subfalcately lanceolate, obtuse, 1-nerved, triangular in transverse section, anterior margins contiguous almost to the apex nearly straight, posterior margins thin, semitransparently yellow-ochre, c. .32 cm. long, c. 17 cm. wide. Petals spathulate, obtuse 1-nerved, convex keeled outside, white, c. .25 long, c. .10 cm. wide. Lip inconspicuously 3-lobed, fleshy, concave inside, 1-nerved, base geeen, remainder white, spread out c. .27 cm. long, c. .20 cm. wide across the side lobes, side lobes very short broad thin, midlobe subquadrate. Column green, together with the greenish white rostellum c. .30 cm. long, margins of clinandrium produced in front to a triangular lobe, rostellum large triangular with the apex ending in 2 long teeth margins erect. Ovary short, curved, clubbed, rather laterally dilate, 6-grooved, c. .10 cm. long.

Pahang, Kota Glanggi, on small trees on the more exposed limestone ridges.

Described from living plants.

Phreatia sulcata, J. J. S. Fl. Buit VI (Orch.) 505; Atlas No. CCCLXXXIII: *P. bracteata,* Ames in Philipp. Journ. Sc. IV (1910) 674: *Dendrolirium sulcatum,* Bl. Bijdr. 347: *Eria sulcata,* Lndl. Gen. sp. Orch. 69; Miq. Fl. Ind. Bat. III, 664.

Pahang, Fraser Hill at c. 3,800 feet altitude, a first record for the Peninsula.

The Fraser Hill plant differs in the rather smaller size, the shorter broader leaves and inflorescence, broader more obtuse sepals and petals and the lip with a very well-defined spurlike sac. The column foot is shorter than that shown in the figure in Dr. J. J. Smith's Atlas.

Distribution:—Java, Sumatra, Borneo and the Philippines.

Phreatia laxiflora, Lndl. Gen. sp. Orch. 64; J. J. S. Fl. Buit. VI (Orch.) 501; atlas No. CCCLXXIX: *P. coriacea* Lndl. 1. c.; Miq. Fl. Ind. Bat. III. 656: *Dendrolirium laxiflorum,* Bl. Bijdr. 350: *D. coriaceum,* Bl. Bijdr. 351:

Eria laxiflora Miq. l. c. 665: E. *coriacea* Rchb. f. Bonpl. V (1857) 54.

Pahang, Cheka river, a first record for the Peninsula. Distribution:—Java.

Phreatia parvula, Hook. f. Fl. Brit. Ind. V, 811; J. J. Smith Fl. Buit. VI (Orch.) 500; Atlas No. CCCXXVII: *P. nana,* Hook. f. 1. c.; Ic. Pl. to 2084: *Octarrhena parvula,* Thw. Enum. 305; Trim. Fl. Ceyl. IV, 28.

The following has to be added as a synonym:— *Oberonia condensata,* Ridl. in Journ. Linn. Soc. XXXVIII, 322; Fl. Mal. Pen. IV, 18.

Distribution:—Ceylon, Java, Sumatra.

Phalaenopsis Hebe, Rchb. F. Hamb. Gartenz. XVIII (1862) 35; Xen. Orch. 11, 5, 146, t. 156, f. II.; J. J. S. in Fl. Buit. VI Orch. (1905) 551; Atlas Fig. CDXVII: *P. bella* T. & B. Nat. Tijdschr. Ned. XXIV (1862) 321. *P. amethystina* Rchb. f. Gard. Chr. 1865, 602.

Pahang, several localities; new to the Peninsula.

Distribution:—Java, Sumatra.

Adenoncos vesiculosa, sp. nov. Caulis brevis. Folia lineari-lanceolata, sub apice pungente abrupte angustata, valde carnosa, vaginis tubulosis. Inflorescentiae e basi internodiorum, breves, 1-2-florae. Sepalum dorsale triangulari-oblongum, breviter acuminatum, obtusissimum vel subtruncatum. Sepala lateralia falcate oblongo-lanceolata, obtusa. Petala oblonga, obtusa. Labellum obovatum, obtusum vel subretusum, basi in callum magnum cruciformem vesiculosum elevatum. Gynostemium breve, validum, brachiis brevissimis minute denticulatis.

Stem short, erect or erecto-patent, up to c. 5 cm. long. Leaves linear-lanceolate, abruptly contracted below the apex to a very short pungent tip, very fleshy, rather twisted, acutangularly or rightangularly concave minutely wrinkled green inside, rounded paler outside, up to c. 1.30 long, up to c. .30 cm. wide, base twisted, sheaths tubular minutely wrinkled up to c. .30 cm. long. Inflorescences from the base of the internodes behind the leaves, short, 1-2-flowered. Flowers well expanded, small. Sepals and lip green, petals pale green. Dorsal sepal triangular-oblong, shortly acuminate, apex very fleshy obtuse or subtruncate, 1-nerved, keeled on the back, c. .21 cm. long, c. .12 cm. wide. Lateral sepals falcately oblong-lanceolate, obtuse, fleshy, strongly keeled on the back, 1-nerved, c. .25 cm. long, c. .13 cm. wide. Petals oblong, obtuse, keeled on the back, 1-nerved, c. .18 cm. long, c. .07 cm. wide. Lip obovate, obtuse or subretuse, base very fleshy, a large cruciform vesicular callus at the base, 3-nerved the outer nerves branched from the base the inner nerves branched towards the apex, concave inside,

spread out c. .33 cm. long, c. .40 cm. wide. Column short, stout, arms very short minutely denticulate at the apex, clinandrium slightly excavate ovate, rostellum grooved, stigma excavate semilunate.

Pahang, Fraser Hill at c. 4,000 feet altitude on a small tree together with *Microsaccus truncatus*, Carr.

Described from living plants and flowers preserved in spirit.

Vanda tricolor, Lndl. **var. purpurea**, var nov. Caulis validus, elongatus. Folia basi erecto-patentia, apicem versus recurva, lineari-lorata, apici obtuse inaequaliter biloba lobis praesertim denticulata dente majore in sinu, rigida, coriacea. Inflorescentiae erecto-patentes, laxe c. 5-florae. Bracteae parvae, late triangulares. Sepala petalaque late spathulata, marginibus recurvis undulatis, petalis falcatis. Labellum 3-lobum, calcaratum, callis 2 pulviniformibus utraque sulcae angustae parte ad faucem calcaris; lobi laterales erecti, leviter torti, quadrati; lobus intermedius panduriformis, apici bilobus lobis latis rotundatis, marginibus basi in lobum latum cotundatum leviter recurvum obtusum instructis, medio angustatus deinde abrupte dilatatus, apicem versus angustatus, carinibus 3 e basi sub apice rugosis et evanescentibus; calcar oblongum, obtusum, lateraliter compressum, dorso carinatum, intus papillosum et breviter pilosum. Gynostemium breve, conicum, vel triangulari-conicum, dorso subcarinatum, ventre leviter concavum, lateribus subsulcatum, clinandrio leviter excavato carina media donato, stigmate anguste transverse ovali. Anthera transverse oblonga, antice in rostrum triangulare obtusum producta, dorso carinata. Pollinia 4 in corpusculis 2 triangulari-oblongis obtusis conjuncta, supra subtusque valde compressa, stipite lineari, glandula oblonga apicem versus dilatata. Pes gynostemii brevis, apicem versus dilatatus. Ovarium 6-sulcatum, costis in forma carinarum augustarum valde elevatis.

Stem elongate, stout, rooting, up to 110 cm. long or longer, c. 1.20 cm. diam. Leaves c. 14 at the apex of the stem, alternate, erecto-patent at the base, recurved towards the apex, linear-lorate, apex obtusely unequally bilobed the lobes toothed with sometimes a larger tooth in the notch, rigid, coriaceous, inside rightangularly or obtusangularly concave grooved bright green or yellow-green often with dull purple margins, beneath convex keeled with the keel often dull purple, 22-40 cm. long or more, 2.50-3.50 cm. wide, sheaths minutely wrinkled 2-4 cm. long. Inflorescences from the base of the internodes behind the leaf, erect or erectopatent, laxly c. 5-flowered, peduncle stout terete c. 15 cm. or more long with some very small tubular

sheaths at the base and c. 2 distant above, rachis c. 8. cm. long. Bracts small, broadly triangular. Flowers widely expanded. Sepals and petals broadly spathulate, margins recurved undulate, the petals falcate, white densely spotted maroon inside and suffused rose-lilac towards the white margins, c. 2.75 cm. long, the sepals c. 1.90, the petals c. 1.20 cm. wide. Lip 3-lobed, spurred, 2 yellow orange-spotted hairy cushion-like calli separated by a narrow groove at the base above the entrance to the spur, spread out c. 2.60 cm. long, c. 1.40 cm. wide across the side lobes; side lobes erect, slightly twisted and converging towards the apex, quadrate, concave inside, convex outside, white dotted purple inside towards the anterior margin and towards the base, the nerves fuscous, c. .50 cm. long and as broad; midlobe panduriform, recurved towards the apex, the apex bilobed with the lobes broad rounded, margins produced at the base to a broad rounded slightly recurved obtuse pale yellow lobe, contracted in the middle then abruptly dilate but narrowed towards the apex, keels 3 from the base evanescent and rugose below the apex, base cream with c. 6 short radiating purple streaks, remainder bright rose lilac, spread out c. 2.10 cm. long, c. 1.50 cm. wide across the basal lobes; spur forming about a right angle with the blade of the lip, oblong, obtuse, laterally flattened, keeled on the back, papillose and shortly hairy inside, cream, c. .80 cm. long. Column short, stout, conic or triangular-conic, subcarinate on the back, slightly concave in front, sides shallowly grooved, white with some pale purple dots on the back towards the base, c. .50 cm. long, clinandrium slightly excavate with a median keel, stigma deeply excavate narrowly transversely oval. Anther cucullate 2-celled, the cells suborbicular entirely closed by a suborbicular membrane, transversely oblong with the apex produced to a triangular obtuse beak, keeled on the back, pale yellow spotted brown and suffused pale purple on each side of the keel, some purple dots inside at the base of the cells, c. .40 cm. long and as broad. Pollinia 4, unequal, cohering in 2 triangular-oblong obtuse bodies, strongly flattened above and beneath, yellow, c. .15 cm. long, c. .10 cm. wide, caudicle linear white c. .20 cm. long, disc oblong dilate towards the apex whitish c. .18 cm. long and as broad. Column foot short, dilate towards the apex, cream suffused pale purple. Ovary 6-grooved with the ribs between strongly elevate in the form of narrow keels, white suffused pale rose-lilac, c. 2.50 cm. long, pedicel white as long.

Alor Island (J. Laycock). This plant was first seen by Mr. Laycock in the garden belonging to Heer Baumann, the District Officer. He was so struck with it that he

caused some plants to be collected and shipped to Singapore where they are growing well. In 1930 I took 8 plants to Kew where they are now established. This plant is quite the best proportioned and most beautifully coloured variety of *V. tricolor* Lndl. that I have seen.

Sarcochilus *(§ Chroniochilus)* **tjidadapensis,** Carr in Gard. Bull. S. S. V. (1929) 24; *Chroniochilus tjidadapensis,* J. J. S. in Bull. Jard. Bot. Buit. Ser. II. XXVI (1918) 82; Bull. Jard. Bot. Buit. Ser. III vi. t. 12 f. III.

Pahang, Fraser Hill at an altitude of about 4,000 feet. Dr. J. J. Smith points out that it would be better to include this and the allied species under the section *Chroniochilus.* This is the third species of the section to be reported from the Peninsula.

Chamaeanthus sarcanthoides, comb. nov. (Plate 4, fig. B) *Bulbophyllum sarcanthoides,* Ridl. in Journ. R. As. Soc. S. Br. 50, 131; Fl. Mal. Pen. IV, 71.

This species is a close ally of *Ch. laciniatus,* Carr. As in that species the lip is spurred but it differs in the absence of laciniae.

Cheirorchis, gen. nov.

Caulis brevis, radicans, paucifolius. Folia lateraliter compressa teretiave. Inflorescentiae breves longaeve, pauci-multi-floraeve. Bracteae quaquaversae. Flores intervallis singulatim expansi, fugaces. Sepala petalaque subsimilia, sepalis lateralibus ad pedem gynostemii decurrentibus. Labellum pede gynostemii elastice insertum, leviter saccatum, ecalcaratum, interdum breviter unguiculatum, plus minusve sigmoidee curvum, 3-lobum, lobis lateralibus erectis callo interposito, lobo intermedio carnosulo pulverulente pilosove, sacco tenuissimo. Gynostemium breve, pede longiore. Anthera biloculata, rostrata. Pollinia 2, furcata canaliculatave, stipite longo spatulatim dilatato, disco parvo.

Stem short, rooting, few-leaved. Leaves laterally flattened or terete. Inflorescences short or long, few- or many-flowered. Bracts quaquaversal. Flowers appearing singly at intervals, ephemerous. Sepals and petals subsimilar, the laterals running down the column foot. Lip loosely inserted on the apex of the column foot, slightly saccate, not spurred, sometimes shortly clawed, more or less sigmoidly curved, 3-lobed, side lobes erect with a callus between, midlobe rather fleshy powdery or hairy, sac very shallow. Column short, foot longer. Anther 2-celled, beaked. Pollinia 2, grooved or branched, caudicle long spathulate, disc small.

In habit the genus is very distinct. In the characters of the inflorescence it resembles the genus *Chamaeanthus*, section *Ascochilus* of the genus *Sarcochilus* and section *Dendrocolla* of the genus *Thrixspermum*.

The structure of the flowers much resembles *Dendrocolla* except that the lip is clawed and only very slightly saccate and the midlobe very well developed. The pollinia, however, resemble those of *Sarcochilus* and *Chamaeanthus*. Its proper position would appear to be between *Chamaeanthus* and *Bogoria* or *Chiloschista*.

There are 5 species in the genus which I divide into 3 sections as follows:—

Leaves laterally flattened, ensiform, articulate.
- Peduncle very short glabrous covered with sheaths .. .. 1 § Xiphophyllum
- Peduncle muricate sheaths at base only .. 2 § Dactylophyllum

Leaves terete, articulate .. 3 § Rhaphidophyllum

Key to the species.

Leaves laterally flattened, ensiform, articulate.
- Peduncle very short glabrous covered with sheaths.
  - Midlobe of lip powdery.
    - Pollinia grooved to about the middle.
      - Side lobes of lip shorter than midlobe .. 1 Ch. breviscapa, Carr
      - Side lobes of lip longer than midlobe .. 2 Ch. major, Carr
  - Peduncle muricate, base sheathed.
    - Pollinia grooved to base. 3 Ch. pulverulenta, Carr

Leaves terete, articulate.
- Peduncle elongate glabrous base sheathed.
  - Midlobe of lip hairy .. 4 Ch. filiformis, Carr
  - Midlobe of lip glabrous. 5 Ch. fulgens, Carr

Cheirorchis breviscapa, Carr sp. nov. (Plate 3) Caulis brevissimus paucifolius. Folia c. 5, valde lateraliter compressa, anguste lineari-ensiformia, acuta, vagina valde lateraliter compressa erectopatente internodo longissime superante. Inflorescentiae e basi foliorum inferiorum vaginarumve siccarum ortae, brevissimae, pauciflorae, pedunculo minuto, rachide valde incrassata. Bracteae late triangulares, quaquaversae, rachidem amplius semiamplectentes, tenues. Flores intervallis singulatim expansi, per diem 1 viriditatem conservantes. Sepala petalaque semipellucide lactea, sepalis interdum pallide roseo- lilacino-suffusis, interdum valde patentia. Sepalum dorsale inter-

dum super basin reflexum, ellipticum, acutum vel breviter mucronatum, 3-nervium nervis exterioribus furcatis, extus furfuraceum carinatum. Sepala lateralia usque ad apicem pedis gynostemii fere decurrentia, triangulari-ovata, apiculata, 3-nervia nervis exterioribus furcatis, margine antico basi dilatato, extus sparse furfuracea carinata. Petala oblongo-obovata, obtusa, 3-nervia nervis exterioribus furcatis, extus sparse furfuracea carinata. Labellum 3-lobum, unguiculatum, leviter saccatum, ungue triangulari-oblongo, lamina inter lobos laterales callo pulverulente apice in carinam pulverulentem producto conspicue ornata, lobis lateralibus brevibus oblongis apici rotundatis intus papillosis marginibus ciliolatis, lobo intermedio ovato obtuso supra papilloso denseque pulverulente. Gynostemium breve, rectum, alis triangularibus obtusis, pede longo lineari.

Stem very short, few-leaved, base rooting. Leaves c. 5, strongly laterally flattened, seen from the side narrowly linear-ensiform acute, dull yellow-green, rather shiny, up to 18 cm. long, c. .55 cm. wide, sheath strongly laterally flattened erecto-patent very much exceeding the internode apex oblique, lower margin c. 1 cm. long, upper margin c. 1.70 cm. long. Inflorescences from the base of the lower leaves or from the base of the old sheaths, very short, few-flowered, peduncle minute glabrous, rachis much thickened with minute internodes. Bracts quaquaversal, broadly triangular, glabrous, thin in texture, more than half embracing the rachis. Flowers opening singly at intervals and lasting 1 day. Sepals widely expanded or reflexed from base, semitransparently cream sometimes suffused pale rose-lilac. Dorsal sepal erect or reflexed from the base, elliptic, acute, or shortly mucronate, 3-nerved outer nerves branched, outside furfuraceous keeled, hardly .50 cm. long, c. .27 cm. wide. Lateral sepals running almost to apex of column foot, recurved in middle, triangular-ovate, apiculate. 3-nerved outer nerves branched, posterior margin dilate at base, outside sparsely furfuraceous keeled, c. .50 cm. long, scarcely as broad. Petals not widely expanded, oblong-obovate, obtuse, 3-nerved outer nerves branched, outside sparsely furfuraceous keeled, semitransparently cream, c. .45 cm. long, c. .30 cm. wide. Lip adnate to apex of column foot, 3-lobed, clawed, slightly saccate not spurred, seen from the side sigmoidly curved, claw short triangular oblong, a conic orange-yellow pulverulent callus on the blade between the side lobes produced into a low linear powderly orange-yellow keel reaching to the midlobe, blade a little saccate above the claw, cream, spread out c. .50 cm. long, across the side lobes c. 35 cm. wide; side lobes short, oblong, apex rounded, margins ciliolate, inside papillose, pale cream, c. .15 cm. long; midlobe ovate, obtuse cream, above papillose and

densely yellow-powdery the grains globose or ovoid with minute papillaeform appendages, c. .28 cm. long, c. .25 cm. wide. Column short, straight, dilate at apex, c. .08 cm. long, whitish, wings porrect broadly triangular obtuse as long, clinandrium excavate semilunate with a median keel margins truncate, rostellum produced to a triangular obtuse beak cucullately curved in middle apex decurved, stigma large deeply excavate suborbicular. Anther 2-celled the cells closed by a suborbicular lamella, seen from above subquadrate shortly keeled at base apex produced to a short broad triangular obtuse beak. Pollinia 2, deeply grooved, ovoid, yellow, c. .05 cm. long, caudicle spathulate white c. .09 cm. long, disc triangular-ovate white c. .03 cm. long. Column foot continuing the ovary or making a very obtuse angle with it, linear, truncate, whitish, c. .40 cm. long. Ovary 6-grooved, furfuraceous, pale yellowish, with the minute pedicel c. .47 cm. long. Capsule 6-ribbed, 3 large with 3 very slender between, up to c. 3.25 cm. long, c. .30 cm. diam., pedicel minute.

Pahang, Budu and Batu Balai on small trees in lowland forest, the plants growing on the tips of the branches and even on the leaves themselves.

Desribed from living plants.

Cheirorchis major, Carr sp. nov. . Caulis brevissimus. Folia c. 5, valde lateraliter compressa, anguste lineari-ensiformia, acuta, nitidula, vagina valde lateraliter compressa internodo longissime superante. Inflorescentiae e basi vaginarum ortae, brevissimae, pauciflorae pluriflorae ve, pedunculo minuto glabro, rachide incrassato. Bracteae late triangulares, quaquaversae. Flores intervallis singulatim expansi, sepalis petalisque patentibus. Sepalum dorsale ellipticum, obtusum, 5-nervium, extus rarissime furfuraceum. Sepala lateralia usque ad apicem pedis gynostemii fere decurrentia, late triangularia, medio fere triangulari-acuminata, apice subapiculato anguste obtuso, extus sparse furfuracea. Petala rhombeo-elliptica, obtusa, 5-nervia, extus carinata. Labellum apici pedis gynostemii adnatum, 3-lobum, unguiculatum, esaccatum, lamina inter lobos laterales pulverulente carina media carunculata basi lobi intermedii in callum transversum carunculatum pulverulentem recurvum producta, lobis lateralibus erectis linearibus apici truncatis rotundatisve margine antico papilloso denticulatoque, lobo intermedio breviter lateque ovato obtuso dense pulverulente. Gynostemium breve, pede longissimo lineari.

Stem very short, base rooting. Leaves c. 5, strongly laterally flattened, seen from the side narrowly linear-ensi-

form acute, rather shiny light green, up to 15 cm. long, c. .70 cm. wide, sheath strongly laterally flattened erecto-patent very much exceeding the internode apex oblique c. 1.50 cm. long. Inflorescences from the base of the sheaths, short, few or rather many-flowered, peduncle minute glabrous, rachis thickened internodes minute. Bracts not alternate, broadly triangular. Flowers larger than those of Ch. breviscapa, Carr opening singly at intervals and lasting 1 day. Sepals and petals spreading, cream. Dorsal sepal elliptic, obtuse, 5-nerved nerves branched, inside concave, outside convex very sparsely scurfy, almost 1 cm. long, fully .50 cm. wide. Lateral sepals running almost to apex of column foot, broadly triangular, triangular-acuminate from c. the middle, subapiculate narrowly obtuse, 5-nerved nerves branched the midnerve prominent outside especially towards the apex, outside sparsely scurfy, c. .90 cm. long in the middle, at base c. .67 cm. wide. Petals rhombeo-elliptic, obtuse, 5-nerved nerves branched, inside concave, outside obtusangularly convex with a prominent median keel, c. .78 cm. long, c. .56 cm. wide. Lip adnate to apex of column foot, 3-lobed, clawed, not saccate nor spurred, seen from the side sigmoidly curved, blade between the side lobes powdery with a median carunculate keel ending in a transverse carunculate powdery recurved callus at base of midlobe, cream with some pale lilac spots on the side lobes, the whole spread out c. .80 cm. long, c. .75 cm. wide across the side lobes, claw subqudrate c. .20 cm. long c. .25 cm. wide; side lobes erect, subquadrate, apex truncate or very slightly rounded, anterior margin papillose and denticulate, c. .25 cm. long, c. .28 cm. wide; midlobe shortly broadly ovate obtuse, densely powdery, c. .25 cm. long, c. .38 cm. wide. Column short, forming an obtuse angle with the ovary, tapering upwards, c. .17 cm. long, clinandrium excavate transversely oval, rostellum produced to a tongue-shaped beak, stigma large deeply excavate oval. Anther 2-celled with the cells closed by a triangular lamella, seen from above ovate the cells elevate with a short keel between, produced in front to a broad triangular subacute beak, in all c. .24 cm. long and about as wide. Pollinia 2, deeply grooved, ovoid, caudicle narrowly spathulate, disc oblong, together c. .12 cm. long. Column foot making almost a right angle with the column, very shortly free at apex, very long, linear, straight, c. .65 cm. long, c. .13 cm. wide. Ovary short, 6-grooved, c. .30 cm. long.

Pahang, Krambit on the tips of the branches of small trees. This species, together with the last, is remarkable for the very long narrow column foot.

Described from a living plant and flowers preserved in spirit with colour notes.

Gardens Bulletin, S.S.

Cheirorchis pulverulenta, Carr sp. nov. . Caulis brevis. Folia 3-5, valde lateraliter compressa, ensiformia, breviter acuminata, acuta, falcatula, vagina patente valde lateraliter compressa internodo longissime superante. Inflorescentiae e basi vaginarum ortae, pauciflorae, pedunculo terete apicem versus incrassato dense longiuscule muricato, rachide abrupte dilatata. Bracteae quaquaversae, triangulares, acutae, extus carinatae muricataeque. Flores intervallis singulatim expansi, per diem 1 viriditatem conservantes. Sepalis petalisque e basi reflexis. Sepalum dorsale oblongum vel oblongo-ellipticum, obtusum, 3-nervium. Sepala lateralia usque ad apicem pedis gynostemii fere decurrentia, subfalcata, triangulari-oblonga, obtusa, 3-nervia. Petala oblongo-oblanceolata, obtusa, 3-nervia. Labellum apici pedis gynostemii adnatum, 3-lobum, unguiculatum, saccatum, sacco callo magno tumido pulverulente aurantiaco donato, inter lobos laterales sulco pulverulente basin lobi intermedii attingente, lobis lateralibus erectis oblongis obtusis papillosis marginibus minute ciliolatis, lobo intermedio abrupte recurvo carnoso dense pulverulente supra viso triangulari-oblongo obtusissimo, sacco brevi lato conico obtuso. Gynostemium breve, pede vix longiore.

Stem short, rooting below, up to c. 1 cm. long. Leaves 3-5, strongly laterally flattened, slightly falcate, ensiform, shortly acuminate towards the acute apex, fleshy, longitudinally wrinkled, at first green then yellow-green, lower ones longest up to c. 6 cm. long, c. .50 cm. wide, sheath strongly laterally flattened, longitudinally wrinkled, spreading, long exceeding the internodes, apex oblique, yellow-green drying on the fall of the leaf, upper margin c. 1 cm. long, lower margin c. .60 cm. long. Inflorescences from the base of the sheaths, erect or suberect, few-flowered, peduncle terete dilate towards apex densely and rather long-muricate a small tubular sheath at base dull green c. 1 cm. long, rachis abruptly thickened dull green c. .30 cm. long. Bracts quaquaversal, in appearance resembling *Ascochilus*, triangular, acute, margins denticulate, inside deeply concave, outside highly convex strongly keeled muricate, dull green, c. .18 cm. long, c. as broad. Flowers appearing singly at intervals, ephemerous. Sepals and petals reflexed from base, thin in texture, semitransparently pale yellow. Dorsal sepal oblong or oblong-elliptic, obtuse, 3-nerved outer nerves branched, inside convex, outside concave, c. .38 cm. long, c. .22 cm. wide. Lateral sepals running almost to apex of column foot, subfalcate, triangular-oblong, obtuse, 3-nerved outer nerves branched, inside convex, outside concave, c. .38 cm. long, c. .28 cm. wide. Petals oblong-oblanceolate, obtuse, 3-nerved, inside convex, outside concave, c. .40 cm. long, c. .20 cm. wide. Lip adnate to apex of column foot,

3-lobed, clawed, saccate, seen from the side strongly sigmoidly curved, a large median tumid orange powdery callus in the sac and a short median powdery groove with raised margins between the side lobes running to the base of the midlobe, the whole spread out c. .27 cm. long, c. .37 cm. wide across the side lobes, claw short broad dilate towards apex c. .05 cm. long, sac short broad conic obtuse cream; side lobes erect, oblong, obtuse, papillose, margins minutely ciliolate, cream, c. .15 cm. long, c. .10 cm. wide; midlobe abruptly recurved, fleshy, cream, above convex densely bright yellow-powdery the grains globose with minute papillaeform appendages, beneath concave glabrous, seen from above triangular-oblong very obtuse, c. .15 cm. long and as broad or broader. Column making a very obtuse angle with the ovary, short, straight or slightly curved on back and rather warty, whitish, c. .12 cm. long, clinandrium deeply excavate transversely oblong with a median keel, rostellum large produced to a triangular obtuse decurved beak, stigma excavate large oblong margins below the rostellum a little incurved. Anther 2-celled the large suborbicular cells partly closed by a small suborbicular lamella, seen from above transversely oblong, produced at apex to a short broad triangular obtuse beak, whitish, c. .08 cm. long, c. .10 cm. groad, Pollinia 2, grooved to the base, suborbicular, flattened inside, caudicle slightly spathulately dilate from the linear base, white, disc elliptic whitish. Column foot forming an obtuse angle with the column, straight, subverrucose, narrowed towards the apex, whitish, c. .15 cm. long. Ovary 6-grooved, scurfy, dilate towards apex, pale yellow-green, c. .20 cm. long.

Pahang, Tembeling on small trees in the forest growing near the tips of the branches.

Described from living plants.

Cheirorchis filiformis, comb. nov. (Plate 4, fig. A) *Sarcochilus filiformis*, Hook f. Fl. Brit. Ind. VI. (1890) 39, Ic. Pl. 2124., etc., etc.

This plant is best placed under *Cheirorchis*, the structure of the flowers and the 2 grooved pollinia being quite characteristic. It is a wide-spread and not uncommon plant in the Peninsula and, as in the other members of the genus, grows on the tips of the branches of small trees.

Cheirorchis fulgens, comb. nov. . *Dendrocolla fulgens*, Ridl. in Journ. Linn. Soc. XXXII, 383., etc. This is a close ally of *Ch. filiformis*, Carr.

Thrixspermum *(§ Dendrocolla)* **tenuicalcar**, sp. nov. (Plate 4. fig. c). Caulis brevis, validus. Folia c. 5, linearilanceolata vel lineari-oblanceolata, acuta, crasse carnosa,

vaginis tubulosis. Inflorescentiae multiflorae, pedunculo terete apicem versus incrassato, rachide incrassata densa. Bracteae quaquaversae, triangulares, acutae, carnosae. Sepalum dorsale ellipticum vel elliptico-oblanceolatum, apiculatum. Sepala lateralia falcata, transverse et late oblonga, apiculata. Petala e basi breviter unguiculata falcata, oblonga, obtusa. Labellum 3-lobum, longe et tenuiter calcaratum, callo oblongo retuso carnoso supra canaliculato inter lobos laterales, fascia magna humili suborbiculari pilosa basi lobi intermedii; lobi laterales erecti, elliptici, obtusi; lobus intermedius triangulari-ovatus, retusus dente triangulari in sinu, marginibus erosis; calcar longum, tenerrimum, cylindricum, apicem acutum versus exterius decrescens. Gynostemium breve, pede lineari, longiore.

Stem short, stout, rooting at the base, roots elongate stout. Leaves c.5, spreading, linear-lanceolate or linear-oblanceolate, distinctly narrowed below the recurved acute apex, thickly fleshy, the base distinctly narrowed to the sheath, grooved dull green above with dark purple margins, conspicuously keeled beneath, c. 5.50-8.50 cm. long, c. .83-.93 cm. wide, sheaths tubular dull green thickly spotted dark purple up to c. .80 cm. long. Inflorescences often more than 50-flowered, peduncle elongate terete dilate towards the apex dull green more or less blotched purple c. 8 cm. long, rachis thickened dense up to c. 5 cm. long. Bracts quaquaverse, triangular, acute, fleshy, recurved towards the apex, concave inside, convex outside, dull green more or less dotted dull purple, c. .15 cm. long and as broad. Flowers appearing at intervals singly or in pairs, not widely expanded, lasting 1 day. Speals and petals cream, whitish or pale ochre. Dorsal sepal elliptic or elliptic-oblanceolate, apiculate, 5-nerved, deeply concave inside, highly convex outside with an inconspicuous median keel, c. .85 cm. long, scarcely .50 cm. wide. Lateral sepals running down almost to the apex of the column foot, slightly twisted above the middle, reflexed below the apex, falcate, transversely and broadly oblong, apiculate, 5-nerved, anterior margin minutely erose towards the apex roundly dilate above the base, distinctly keeled outside, c. .85 cm. long, c. .60 cm. wide. Petals falcate, oblong above the shortly clawed base, apex broadly roundly obtuse, 5-nerved, concave inside, convex inconspicuously keeled outside, c. .85 cm. long, c. .43 cm. wide. Lip adnate to the apex of the column foot, 3-lobed, very slenderly spurred, callus between the side lobes an oblong retuse fleshy yellow lamella concave above, a large low suborbicular, long-hairy purplish fascia at the base of the midlobe, c. .90 cm. long from the mouth of the spur to the apex of the midlobe, spread out c. .90 cm. wide across

the side lobes; side lobes erect elliptic, obtuse, minutely papillose towards the base, sparsely hairy towards the point of junction with the midlobe, anterior margin denticulate and ciliolate in the sinus with the midlobe, pale yellow with c. 7 longitudinal purple streaks, anterior margin c. .40 cm. posterior c. .90 cm. long; midlobe triangular-ovate, retuse with a triangular tooth in the sinus, towards the base rather long-hairy, towards the margins very shortly hairy, margins erose, pale yellow, c. .30 cm. long, c. .50 cm. wide at the base; spur long, very slender, straight, cylindric, tapering towards the acute apex, minutely papillose inside, yellow, fully 1 cm. long from the tip to the apex of the column foot, c. .80 cm. long from the tip to the base of the blade. Column short, stout, straight, white, c. .17 cm. long, arms incurved over the clinandrium apex toothed, clinandrium excavate suborbicular, stigma excavate transversely elliptic, foot linear with the apex very shortly bilobed white. Anther 2-celled, suborbicular as seen from above, produced in front to a short truncate convex beak, 2 small transversely oblong lobes at the base, white, c. .10 cm. long. Pollinia 4, unequal, cohering in 2 oblong bodies, the anterior 2 larger, creamy yellow, c. .08 cm. long; caudicle spathulate, margins strongly reflexed, white, c. .08 cm. long; disc transversely oblong. Ovary 6-grooved, furfuraceous green, with the pedicel c. .90 cm. long.

Pahang, Batu Talam.

This very interesting plant has the habit of a Dendrocolla and is very distinct by reason of the deep lobing of the lip and the long slender spur. I know of no near ally. Described from living plants.

Thrixspermum *(§ Dendrocolla)* **pulchrum,** sp. nov. (Plate 5, fig. A). Caulis brevis. Folia elliptica vel elliptico-oblanceolata, breviter biloba sinu in dentem brevem instructa, vaginis brevibus tubulosis. Inflorescentiae multiflorae, pedunculo terete apicem versus incrassato, rachide incrassata densa. Bracteae quaquaversae, triangularae, acutae. Sepalum dorsale basi unguiculatum, supra ellipticum, obtusum praesertim in murcronem brevem instructum, Sepala lateralia basi breviter unguiculata, supra falcata, ovata obtusa, margine antico medio fere rotundate dilatato. Petala subfalcata, spathulata, obtusa. Labellum 3-lobum, profunde saccatum, carina longepilosa ex apice sacci inter lobos laterales super medium in callum transverse oblongum pilosum dilatata; lobi laterales triangulari-oblongi, obtusi, margine antico apice excepto clavato-piloso, intus apicem versus calavato-pilosi; lobus intermedius brevissimus, triangularis, obtusus, dense longe clavato-pilosus; saccus

oblongo-conicus. Gynostemium breve, pede longiore. Anthera biloculata, transverse oblonga, truncata, basi utrinque lobulo transverse oblongo donata. Pollinia 4, inaequalia, antica majora, ovalia.

Stem short, fairly stout, rooting at the base, c. 2 cm. long. Leaves c. 6, elliptic or elliptic-oblanceolate, shortly unequally subobtusely bilobed with a very short tooth in the notch (the apex of the midrib), thickly fleshy, grooved above, inconspicuously keeled beneath, pale yellow-green, 2-3.75 cm. long, .65-1.20 cm. wide, sheaths short tubular inconspicuously ribbed up to c. .37 cm. long. Inflorescences from the bases of the sheaths behind the leaves, shorter or longer than the leaves, c. 10-flowered, peduncle terete thickened upwards, rachis short dense. Bracte quaquaverse, triangular, acute, fleshy, green. Flowers appearing at intervals 1-2 at a time and lasting for less than 1 day, widely expanded, fragrant, c. 1.10 cm. long, c. 1.30 cm. wide. Sepals and petals yellow, base excepted densely blotched bright purple or almost entirely bright purple. Dorsal sepal clawed at the base for c. .15 cm., blade elliptic obtuse sometimes very shortly mucronate, 5-nerved the nerves branched in the upper half, margins minutely erose towards the apex, concave inside, convex inconspicuously keeled outside, c. .60-.70 cm. long, c. .32-.40 cm. wide. Lateral sepals running down to the apex of the column foot, shortly clawed at the base, blade falcate ovate obtuse, margins minutely erose towards the apex with the anterior margin roundly dilate at about the middle, conspicuously keeled outside, nerves 5 the inner 3 branched towards the apex, c. .60-.70 cm. long, c. .37-.42 cm. wide. Petals subfalcate, spathulate, obtuse, nerves 3 the median branched towards the apex, margins minutely erose towards the apex, concave inside, convex outside, c. .55-.60 cm. long, c. .27-.30 cm. wide. Lip adnate to the apex of the column foot, 3-lobed, deeply saccate, blade between the side lobes covered with white clubbed hairs, pale yellow, apex of sac darker, some purple spots outside on the blade below the apex, spread out c. .70 cm. long, c. .80 cm. wide; side lobes triangular-oblong, obtuse, posterior margin curved, the anterior margin clavate-hairy except at the apex, inside clavate-hairy towards the apex; midlobe very short, triangular, obtuse, covered densely with long clubbed hairs, c. .02 cm. long, c. .12 cm. wide at the base; sac large, oblong-conic, apex retuse rather incurved, a little dilate in the middle, flattened in front, dilate on the back, a keel inside covered with long clubbed hairs running from the tip to the middle of the blade ending in a transversely oblong hairy callus. Column short, broad, fleshy, narrowed upwards, concave in front with rounded arms, pale yellowish, c. .15 cm. long,

clinandrium semilunate excavate with a short median keel, stigma deeply excavate very small, suborbicular. Anther 2-celled, transversely oblong, truncate, shortly grooved above the base, base produced on each side to a transversely oblong lobe, white, c. .06 cm. long, c. .10 cm. wide. Pollinia 4, unequal, cohering in 2 oval bodies, the anterior larger concave on the inner face, caudicle short oblong, disc ovate. Column foot longer than the column. Ovary 6-grooved, furfuraceous, pale yellow-green with pale purple ribs, c. .60 cm. long.

Pahang, Krambit. Scented strongly of lily of the valley (*Convallaria majalis*).

A small plant closely allied to *Th. recurvum,* Carr from which it differs in the much more slender inflorescence with less fleshy bracts, the smaller, fragrant and differently coloured flowers, the shorter narrower side lobes of the lip, etc.

Described from the living plant.

Pomatocalpa elongatum, sp. nov. Caulis validus, elongatus. Folia oblonga vel oblongo-lanceolata, biloba, coriacea. Inflorescentiae paniculatae. Bracteae brevissimae, late triangulares, obtusae. Sepala oblongo-oblanceolata, obtusissima, lateralia falcata. Petala falcata, anguste oblongo-obovata, obtussissima. Labellum 3-lobum, calcaratum, lobis lateralibus triangularibus subacutis, lobo intermedio ovato subacuto, calcare basi cylindrico sub apice clavato-dilatato carnoso. Gynostemium breve, latum, apici truncatum.

Stem stout, elongate, leafy, oval or subterete in transverse section, base covered with leaf sheaths, 120 cm. long or longer, internodes c. 2.50 cm. long. Roots elongate, fleshy, terete, 1 rarely 2 from each internode. Leaves spreading, oblong or oblong-lanceolate, abruptly narrowed below the apex, the apex broadly obtusely equally or unequally bilobed with a minute tooth in the sinus, coriaceous, margins undulate often recurved, convex grooved dull green above, concave paler below with a conspicuous median keel, up to c. 13 cm. long, c. 3.25 cm. wide; sheaths tubular, much longer than the internodes, keeled on the back, dull green, the young ones often fusco-punctate, up to. c. 4.50 cm. long. Inflorescences from behind the leaf and well below the root, erect or erecto-patent, panicled, dull green streaked and spotted dull purple; peduncle terete, c. 22 cm. long with a short tubular fleshy dull geen sheath at the base and c. 5 similar ones at intervals above; panicles erect or erecto-patent, nude in the lower half, in the upper half densely many-flowered thickened subterete many-grooved, up to c. 8 cm. long, scarcely .30 cm. diam. Bracts very short, qua-

quaverse broadly triangular, obtuse, dull green. Flowers reversed, 4-5 open together on each panicle, odourless, lasting for a few days. Sepals well expanded, yellow-green or greenish, outside entirely inside in basal half spotted dull purple. Dorsal sepal erect, slightly incurved below the apex, oblong-oblanceolate, apex very obtuse minutely ciliotate, fleshy especially at the base, 5-nerved, slightly convex inside, slightly concave with an inconspicuous minutely papillose keel outside, c. .60-.80 cm. long, c. .32-.38 cm. wide. Lateral sepals well expanded, falcate, oblong-oblanceolate, apex very obtuse minutely ciliolate, fleshy especially at the base, 5-nerved, margins attenuate the anterior recurved, convex inside, concave with a conspicuous minutely papillose keel outside, c. .50-.67 cm. long, c. .28-.30 cm. wide. Petals not widely expanding, falcate, narrowly oblong-obovate, apex very obtuse minutely ciliolate, inconspicuously keeled outside, 3-nerved, c. .50-.66 cm. long c. .30-.38 cm. wide. Lip 3-lobed, spurred, fleshy, minutely papillose, a rounded keel on each side running down inside the spur from near the base of the anterior margin of the side lobe, c. .50-.60 cm. long from the apex of the side lobes to the tip of the spur; side lobes erect, continuing the spur, slightly divergent, the anterior margins incurved almost contiguous at the base forming a narrow channel at the base of the midlobe, triangular, subacute, anterior margin c. .18 cm. long, posterior margin c. .25 cm. long, first whitish then yellow with 1 or more purple spots near the base; midlobe ovate, subacute, roundly recurved from the base with the apex appressed to the base of the spur, fleshy, inconspicuously grooved above, white turning sulphur yellow, c. .28 cm long and nearly as broad; spur pendulous, cylindric at the base, laterally dilate below the minutely retuse apex, seen from the side conic, very fleshy, back straight, curved in front, entirely septate by means of an erect thin conduplicate toothed membrane from the apex of the posterior wall with margins adnate to the sides of the spur, c. .18-.25 cm. tall, first greenish then yellow-green, .28-.40 cm. long, .25-.35 cm. wide. Column short, broad, sides fleshy rounded, slightly arched on the back, greenish with some red-purple spots near the base, c. .30 cm. tall, c. .23 cm. wide, clinandrium transversely oblong concave on each side of a median keel green, rostellum large grooved green apex abruptly elevate bidentate yellow; stigma excavate transversely oblong. Anther transversely oval, apex abruptly produced to a subquadrate truncate beak, 2-celled with a small suborbicular lamella at the base of each cell, pale yellow, c. .15 cm. long, c. .18 cm. wide. Pollinia 4, compressed into 2 oval bodies, the posterior much smaller than the anterior, yellow, c. .05 cm. long; caudicle spathulately dilate from a linear base, strongly incurved below the apex, margins revolute at

the base, outside convex but concave below the apex, transparently white, c. .15 cm. long; disc narrowly oval, pale yellow, c. .05 cm. long. Ovary 6-grooved, furfuraceous, dull green, .60-1.20 cm. long.

Pahang, Mentakab, in virgin forest.

This interesting plant is a close ally of *P. truncatum*, J. J. S. from Borneo. As in that species the spur is short and fleshy. The membrane of the spur arises from the tip and, the margins being adnate to the sides of the spur down to the mouth, the spur is rendered completely septate. The membrane is strongly conduplicate, the bases of the fold resting upon the keels on the anterior wall of the spur.

Described from living plants.

Microsaccus brevifolius, J. J. S. in Ic. Bog. 225 (1906). This plant, while occurring abundantly in the mangrove swamps of Singapore, Johore, etc. and on ridges of limestone hills in Pahang, has never been reported officially from the Peninsula. The material in the Singapore herbarium has been labelled *M. javensis* Bl.

Distribution:—Java.

Microsaccus ampullaceus, J. J. S. in Bull. Jard. Bot. Buit. Ser. 3. Vol. V, 99. This is another common species not yet officially recorded from the Peninsula. It grows in the mangrove swamps of Singapore and Johore and the limestone hills of Pahang and Perlis and may often be found growing with *M. brevifolius*, J. J. S.

Distribution:—Sumatra.

Microsaccus sumatranus, J. J. S. in Bull. Jard. Bot. Buit. Ser. 2. XXV (1917) 102. Pahang, Fraser Hill, c. 4,000 feet.

Distribution:—Sumatra.

Microsaccus truncatus, sp. nov. . Caules penduli, omnino foliiferi. Folia alternatim bifaria, valde lateraliter compressa, a latere visa lanceolata, subacuta vel anguste obtusa, vagina lateraliter compressa apice obliqua. Inflorescentiae ex axilis foliorum, brevissimae, 2-florae. Bracteae triangulares. Sepala vix expansa, oblonga, sub apice dilatata, triangularia obtusa. Petala parallela, latiora, subfalcata, transverse oblonga, obtusa, margine postico medio fere leviter dilatato. Labellum marginibus gynostemii adnatum, integrum, longiuscule calcaratum, lamina dimidio basali oblonga parte libera dilatata transverse oblonga apice truncata, calcare cylindrico apice brevissime canaliculato. Gynostemium labello omnino fere adnatum, rostello magno triangulari bidentato recurvo et gynostemio parallelo.

Stems pendulous, rooting from the base, entirely leafy, unbranched, up to c. 13 cm. long, 1-1.60 cm. wide across the leaves. Leaves dense, strongly laterally flattened, seen from the side lanceolate subacute or narrowly obtuse, lower margin obtusangularly recurved straight from above the base, upper margin roundly curved acutangularly grooved to about the middle, fleshy, minutely wrinkled, light green, .35-.80 cm. long, .18-.25 cm. wide at base, sheath strongly laterally flattened with the apex oblique. Inflorescences from the axils of the leaves, very short 2-flowered. Bracts triangular, highly convex, keeled, semitransparently whitish. Flowers white with a yellow-green spot on the blade of the lip. Sepals equal and similar hardly expanded, the dorsal continuing the ovary, the laterals adnate to the lip, oblong, below the apex dilate roundly triangular obtuse, 1-nerved, strongly keeled outside especially towards the apex, base attenuate, c. .17 cm. long, c. .07 cm. wide. Petals parallel, subfalcate, transversely oblong, obtuse, posterior margin slightly dilate in middle, 1-nerved, inside concave, outside convex, c. .16 cm. long, c. .09 cm. wide. Lip adnate to the margins of the column, entire, spurred, the whole c. .40 cm. long; blade adnate to column for c. .15 cm., adnate part oblong concave free part very short dilate transversely oblong truncate concave c. .04 cm. long c. .10 cm. wide; spur making an obtuse angle with the blade, slightly dilate at base, straight, cylindric, apex shortly grooved, slightly flattened on back, c. .21 cm. long, c. .10 cm. diam. Column adnate to lip for nearly the whole length, stout, straight, clinandrium excavate, stigma large, rostellum large triangular apex bidentate base swollen above base decurved over the stigma then abruptly recurved parallel to the column, the whole c. .12 cm. long. Anther conic, seen from above transversely oval. Pollinia 4 pyriform, flattened or concave beneath, caudicle spathulately dilate from a very narrow base, disc linear-oblanceolate. Ovary 6-grooved, rather long, curved, with the minute pedicel c. .45 cm. long, white.

Pahang, Fraser Hill, c. 4,000 feet altitude on small trees with *Adenoncos vesiculosa*, Carr. Dr. J. J. Smith points out in Bull. Jard. Bot. Buit. Ser. 3. V, 99 the very interesting fact that species of this genus and *Adenoncos* may often be found growing together on the same tree. I have found this association on countless occasions even when the plants occur in few numbers. Thus in April 1931 in an area of newly felled forest at Batu Balai I found a single tree containing *M. ampullaceus*, J. J. S. and *Adenoncos major*, Ridl. though the situation was an unusual one for the former species.

This species is perhaps nearest to *M. javensis*, Bl. from which it is distinguished by the smaller leaves, the much

smaller sepals and petals which expand little, the lateral sepals not dilate at the base and the cylindric slightly retuse spur.

Described from living plants and material preserved in spirit.

Camarotis apiculata, Rchb. f. Bonpl. V. (1857) 39-*Sarcanthus apiculatus* J. J. S. in Fl. Buit. VI. Orch. (1905) 598; Atlas Fig. CDXLV. The following should be added as synonyms:—*Saccolabium saxicolum,* Ridl. in Trans. Linn. Soc. II. iii (1893) 374; Mat. I. 171; Fl. Mal. Pen. iv (1924) 172: *S. flaveolum,* Ridl. in Journ, Linn. Soc. XXXII. 360.

Distribution:—Java, Borneo.

Abdominea macranthera, comb. nov. (Plate 5, fig. B). *Saccolabium macrantherum,* Ridl. in Kew Bulletin 1926 p. 478. Stem c. 1.50 cm. long, stout, 3-leaved in the one plant seen. Leaves erecto-patent, oblong-elliptic, obliquely obtuse, base narrowed, upper one largest c. 7 cm. long, hardly 3 cm. wide, rather thin, sheaths tubular ribbed. Inflorescences from the internodes behind the leaves, slightly deflexed, flexuous, entire, very slender, many-(c. 36) flowered, sheaths at base c. 2 tubular with an extra one above, c. 7 cm. long, lax-flowered, peduncle c. 1.75 cm. long. Bracts spreading or reflexed from the base, lanceolate, acute, lower ones largest, c. .10-.16 cm. long, .06-.08 cm. wide. Flowers rather small. Upper sepal oblong-oblanceolate, acuminate, acute, arched above the middle, 1-nerved, concave inside, convex outside, c. .40 cm. long, c. .18 cm. wide. Lateral sepals broadly ovate, shortly acuminate, acute, falcate, 3-nerved, c. .38 cm. long, c. .20 cm. wide. Petals broadly lanceolate, shortly acuminate, acute, 1-nerved, c. .18 cm. long, c. .10 cm. wide. Lip 3-lobed, spurred, c. .47 cm. long from base to tip of spur; side lobes erect, triangular-oblong, truncate, c. .05 cm. long, c. .10 cm. wide; midlobe porrect, oblong, obtuse, base rather fleshy, narrowed towards the slightly recurved apex, c. .20 cm. long; spur pendulous with a wide mouth, basal 2/3 cylindric, abruptly narrowed above the middle, dilate towards the obtuse apex, 5-nerved, a median keel inside on the back running from the base of the lip almost to the middle of the spur and ending in a low transverse fleshy callus, c. .35 cm. long, c. .15 cm. diam. Column nearly straight, dilate on each side of the stigma, produced on the back to an oblong truncate slightly curved lobe, the whole c. .15 cm. long; clinandrium concave, sides thickened; rostellum very large, ovate, pendulous, convex above, concave below reaching to the entrance to the spur, c. .13 cm. long; stigma large. Anther cucullate, 2-celled, transversely oval, shortly keeled between the cells, abruptly

dilate at the apex to a very large beak; back basal half triangular acuminate, upper half linear truncate, grooved outside, keeled inside, the whole c. 12 cm. long, c. .06 cm. wide at the base of the beak. Pollinia 2, globose, very small, attached near the apex of the caudicle; caudicle very long, narrowly linear, abruptly dilate towards the recurved apex, margins strongly revolute except below the apex, c. .20 cm. long, c. .05 cm. wide below the apex; disc minute, narrowly elliptic.

A very interesting plant which is best in the genus *Abdominea*, J. J. S. agreeing in habit and in the remarkable structure of the column, anther and rostellum.

Selangor: Ulu Gombak 1,500 ft., Hume 21-11-21.

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Plate 1. **Coelogyne membranifolia**, Carr.

a, b. Dorsal sepal.
c, d. Lateral sepal.
e, f. Petals.
g. Lip, spread out.
h. Column.
i, j. Pollinia.

All natural size.

Plate 2. **Bulbophyllum nigropurpureum**, Carr.

a. Plant.
b. Dorsal sepal.
c. Lateral sepals.
d. Petal.
e. Lip, spread out.
f. Flower, from the side.
g. Column with 3 anthers.

a. Slightly reduced, remainder enlarged.

Plate 3. **Cheirorchis breviscapa**, Carr.

a. Plant.
b. Flower, in section.
c. Dorsal sepal.
d. Lateral sepal.
e. Petal.
f. Lip, spread out.
g. Lip, in section.
h. Powder grains.
i. Column, from above.
j. Anther, from above.
k. Anther, from below.
l. Pollinia from above.
m. Pollinia from below.

a. Slightly reduced, remainder enlarged.

Plate 4 Fig. A. **Cheirorchis filiformis**, Carr.

a. Flower, in section.
b. Lip, spread out.
c. Dorsal sepal.
d. Lateral sepal.
e. Petal.
f. Pollinia, from above.
g. Pollinia, from below.

a, c, d, e. Slightly reduced, remainder enlarged.

Plate 4 Fig. B. **Chamaeanthus sarcanthoides**, Carr.

a. Plant.
b. Lateral sepal.
c. Petal.
d. Lip, spread out.
e. Anther, from above.

a. Natural size, remainder enlarged.

Plate 4 Fig. C. **Thrixspermum tenuicalcar**, Carr.

a. Rachis with flower in section.
b. Dorsal sepal.
c. Lateral sepal.
d. Petal.
e. Lip in section.
f. Column.
g. Anther, from above.
h. Anther, from below.
i. Pollinia from above.

a. Natural size, remainder enlarged.

Plate 5 Fig. A. **Thrixspermum pulchrum**, Carr.

a. Flower, in section.
b. Dorsal sepal.
c. Lateral sepal.
d. Petal.
e. Lip, from above.
f. Lip, spread out.
g. Column.
h. Anther, from below.
i. Anther, from above.
j. Pollinia from above.
k. Pollinia from below.

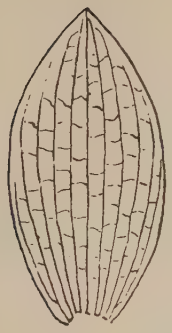
b, c, d, e. Natural size, remainder enlarged.

Plate 5 Fig. B. **Abdominea macranthera**, Carr.

a. Flower, in section.
b. Dorsal sepal.
c. Lateral sepal.
d. Petal.
e. Anther, from above.
f. Anther, from below.
g. Pollinia, from below.
h. Pollinia, from the side.

All enlarged.

Plate 1



a

c

e

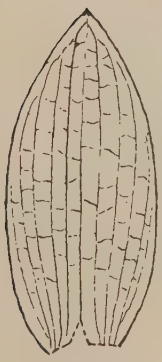


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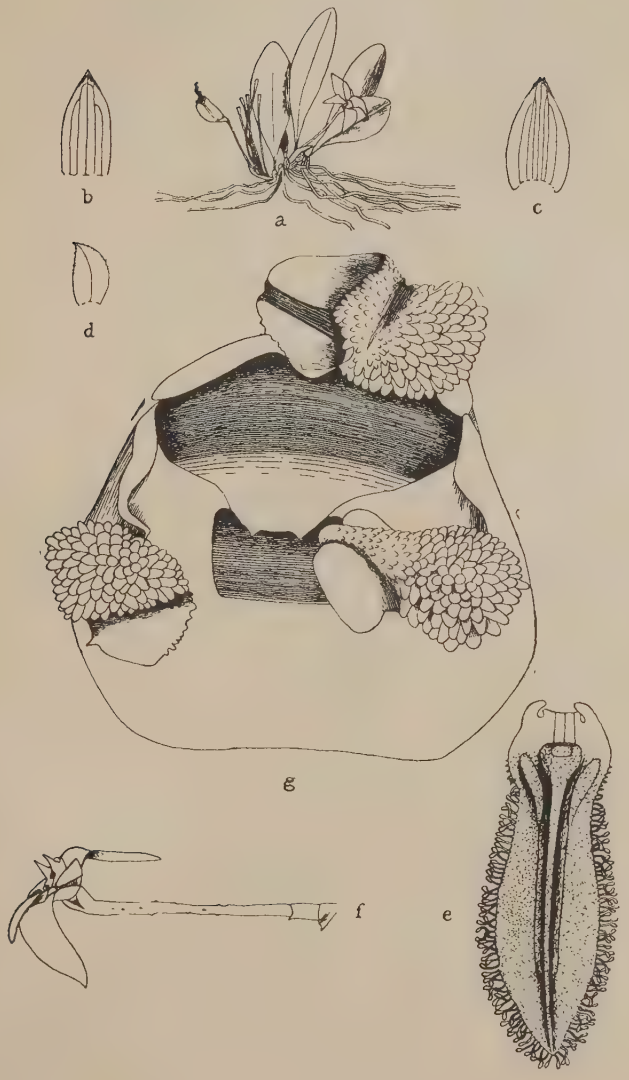
Plate 2



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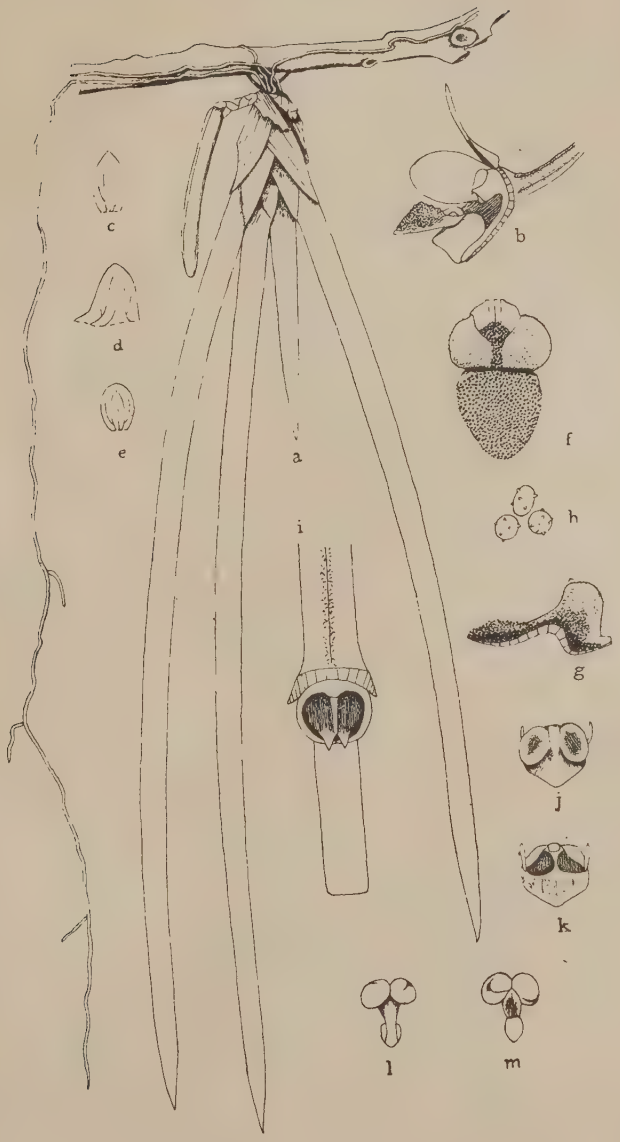

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Plate 4

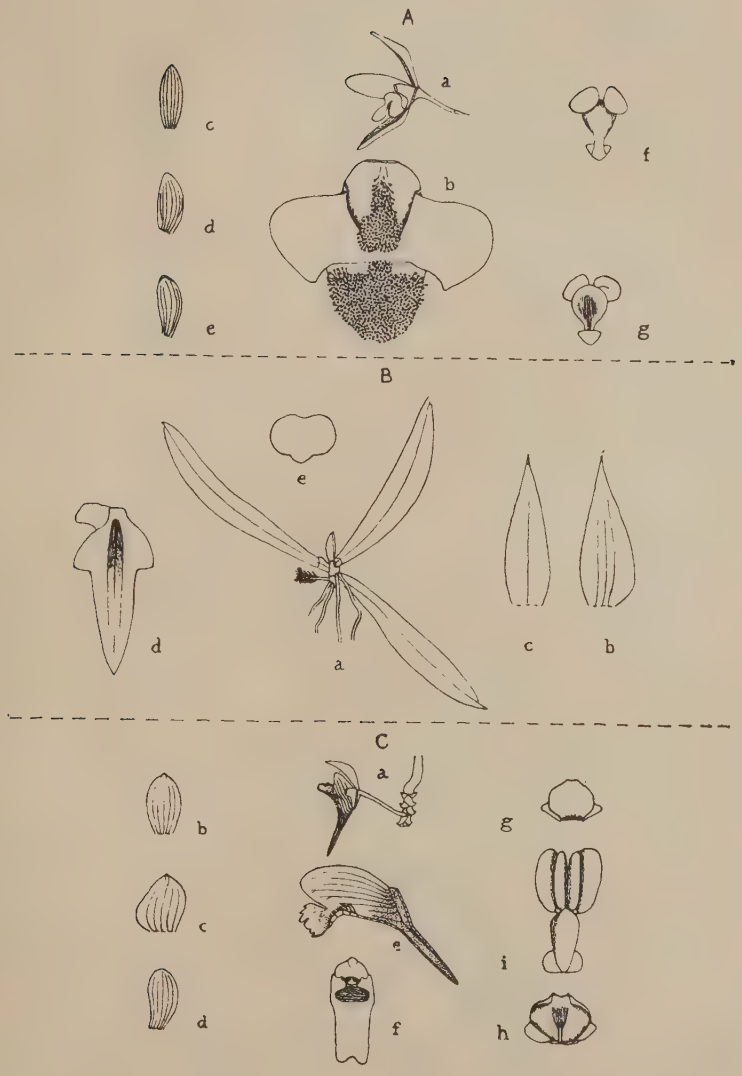

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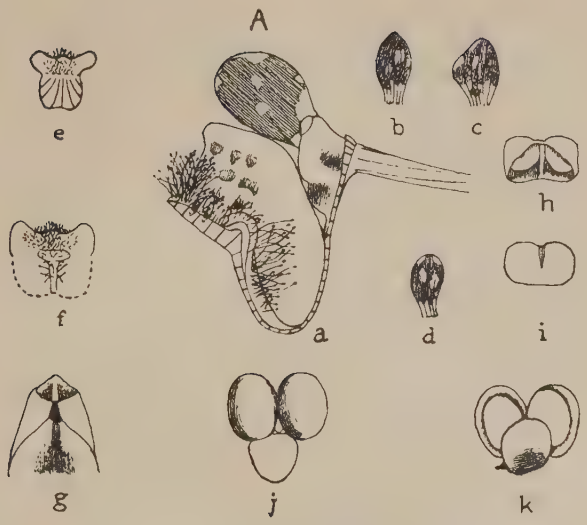
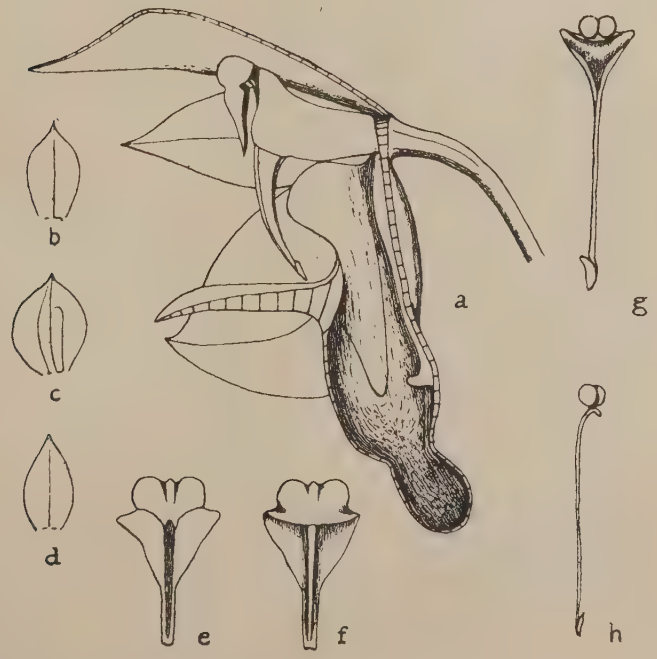
Plate 5





THE GENUS TAENIOPHYLLUM IN THE MALAY PENINSULA.

By C. E. Carr, F.L.S.

with plates 6–14.

In Mr. Ridley's Flora of the Malay Peninsula, Vol. IV, four species of the genus Taeniophyllum are described. Since the publication of that work thirteen additional species have been discovered, chiefly in Pahang, twelve of them being regarded as new species. These new species are here described and illustrated, and a key is given covering all the species now known to occur in the Peninsula. Of those described by Mr. Ridley, *T. macrorrhizum* Ridl. is found to be identical with *T. filiforme* J. J. S., and *T. serrula* Hook. fil. with *T. obtusum* Bl.

TAENIOPHYLLUM, Bl. Small leafless plants, usually epiphytic but rarely terrestrial. Stem short, covered with minute subulate sheaths, sometimes branched. Roots elongate, slender and more or less triangular in section, terete or flattened and ribbon-like with two rows of pneumathodes on the under-surface. Inflorescence short and stout or with elongate filiform peduncle, glabrous, warty, papillose or muricate. Bracts alternate or quaquaversal.

Sepals and petals subsimilar, adnate at the base or free, glabrous or hairy. Lip entire or 3–lobed, spurred, with or without an apical horn-like appendage, glabrous or hairy; spur subglobose subconic or subcylindric often conspicuously dilate below the apex, sometimes closed by a perforated membrane, with or without a swollen gland near the apex. Column short, stigm , with short or long lobes. Anther 4–celled or 2–celled, beak elongate short or 0. Pollinia 4, equal or unequal, pyriform, attached to a linear or spathulate caudicle and an oblong or elliptic disc.

The genus possesses a considerable range of distribution. Approximately 170 species are known ranging from Ceylon and Sikkim through the Malay Peninsula, Sumatra, Java, Borneo, the Celebes and Moluccas, New Guinea, Samoa, New Caledonia, Tahiti, Fiji to Australia (*T. Muelleri,* Lndl.). To the North-east it ranges through the Philippines to Japan with one representative (*T. aphyllum.* Makino).

Taeniophyllum reaches its maximum development in Sumatra (6), The Malay Peninsula (17), Java (21) Borneo (6), the Celebes (9) and New Guinea, from which some 84 species have been described. It seems tolerably certain that intensive investigation will reveal the presence of many

more species in Sumatra, Borneo the Celebes and the Moluccas.

Schlechter, in Fedde Repert. Beih. i (1913), divided the genus into 2 sub-genera, *Codonosepalum* with sepals and petals adnate at the base and *Eutaeniophyllum* with sepals and petals free.

As the accompanying table shows, separate treatment of the two sub-genera accentuates New Guinea, with 80 species, as the centre of development of *Eutaeniophyllum* which is comprised of some 123 species. The smaller sub-genus, *Codonosepalum*, on the other hand will be found to posses the wider geographical distribution with *T. Alwisii*, Lndl. in Ceylon, *T. scaberulum*, Hook. F. in Tranvancore, *T. retrospiculatum*, K. and P. in Sikkim, *T. aphyllum*, Makino in Japan, *T. minutissimum*, Schltr. in New Caledonia and *T. Muelleri*, Lndl. in Australia. New Guinea has but 4 representatives of *Codonosepalum*, the centre of development of which lies further West in Java (13) Borneo (3), the Malay Peninsula (9) and Sumatra (4). Further investigation of Borneo and Sumatra is likely still further to accentuate this.

Distribution Table.

	Codonosepalum	Eutaeniophyllum
Ceylon	1	—
Travancore	1	—
Sikkim	1	1
Malay Peninsula	9	8
Sumatra	4	2
Java	13	8
Borneo	3	3
Philippines	2	3
Japan	1	—
Celebes	3	6
Moluccas	1	2
New Guinea	4	80
New Caledonia	1	1
Bismark Is	—	2
Carolin Is	—	1
Palau Is	1	—
Tahiti	—	2
Society Is	—	1
Fiji	—	2
Samoa	—	1
Australia	1	—

The majority of the species are epiphytic on branches of shrubs and trees, and the genus is represented both in

the low country and in the hills. Some species, such as *T. viride*, Carr, *T. Stella*, Carr. and *T. tjibodasanum*, J. J. S. etc. appear to thrive on portions of dead twigs on the ground equally well as on living trees, and the Javanese *T. radiatum*, J. J. S. is both epiphytic and terrestrial on stones. They seem to prefer the tips of the branches among the leaves and, owing to their small size, are very difficult to see.

Most of the species are free–flowering and in many cases inflorescences continue to produce flowers at intervals of a few days for many months. A well established plant will support many inflorescences at the same time. While both *Codonosepalum* and *Eutaeniophyllum* have members whose flowers remain fresh for several days, generally speaking the species of *Codonosepalum* flower by night, the flowers withering in the morning, while the species of *Eutaeniophyllum* flower by day and wither in the evening.

The nearest affinity of the genus is with Microtatorchis, Schltr., a genus with at present few members outside New Guinea and no known representatives in the Peninsula. Two sections of *Taeniophyllum*, namely *Loboglossum*. Schltr. and *Trachylepus*, Schltr. are as yet unrepresented in this country while three new sections, namely *Mitocaulon*, *Amphilaphes* and *Dichanthera* are here proposed.

KEY TO SUB-GENERA AND SECTIONS.

Sepals and petals adnate at base	Sub-genus Codonosepalum Schltr.
Bracts alternate	Sepalocodon, Schltr. nos. 1–8
Bracts quaquaversal	Mitocaulon, Carr no. 9
Sepals and petals free	Sub-genus Eutaeniophyllum Schltr.
Beak of anther short	
Bracts quaquaversal	Amphilaphes, Carr nos. 19–11
Bracts alternate	Brachyanthera, Schltr. nos. 12–15
Beak of anther elongate	
Flowers glabrous	Rhyncanthera, Schltr. no. 16
Beak of anther separated by a transverse groove.	
Flowers hairy	Dichanthera, Carr no. 17

Key to the Species.

CODONOSEPALUM, Schltr. Sepals and petals adnate at base.

1. SEPALOCODON, Schltr. Bracts alternate

Roots very slender, more or less triangular in section.

Flowers minute, yellow-green or greenish — 1. T. pahangense, Carr

Flowers small, greenish white. — 2. T. viride, Carr

Flowers small, pink. — 3. T. rubrum, Ridl.

Roots slender, terete.

Flowers small pale whitish. — 4. T. tjibodasanum, J. J. S.

Roots flattened, smooth.

Flowers small whitish. Apical appendage of lip minute, tooth-like. — 5. T. campanulatum, Carr

Flowers rather large, apical appendage of lip O. — 6. T. Stella, Carr

Flowers medium, salmon, apical appendage of lip well developed. — 7. T. intermedium, Carr

Roots flattened, minutely wrinkled.

Flowers small, deep pink. Peduncle elongate, filiform. — 8. T. rugulosum, Carr

2. MITOCAULON, Carr. Bracts quaquaversal.

Roots flattened, smooth.

Flowers small, greenish or yellow-green. Peduncle elongate, filiform. — 9. T. culiciferum, Ridl.

EUTAENIOPHYLLUM, Schltr. Sepals and petals free.

3. AMPHILAPHES, Carr. Anther beak short, Bracts quaquaversal.

Rachis lax.

Flowers medium, yellow and white. — 10. T. montanum, Carr

Rachis dense.

Flowers minute, white — 11. T. micranthum, Carr

4. BRACHYANTHERA. Schltr. Anther beak short, Bracts

alternate.

Spur conic.

Rachis dense. Flowers small. Lip concave entire.	12.	T. obtusum, Bl.
Rachis lax. Flowers medium. Lip 3–lobed.	13.	T. calceolus, Carr

Spur cylindric.

Flowers small. Lip concave at base, apex fleshy grooved, blade glabrous.	14.	T. pallidiflorum, Carr
Flowers medium. Lip concave, blade hairy.	15.	T. annuliferum, Carr

5. RHYNCANTHERA, Schltr.

Anther beak elongate

Peduncle elongate, filiform. Spur elongate, clubbed.	16.	T. filiforme, J. J. S.

6. DICHANTHERA, Carr. Anther beak separated by a transverse groove.

Flowers hairy. Side lobes of lip large, rounded, mid-lobe minute.	17.	T. rostratum. Carr

1. **Taeniophyllum** (§*Sepalocodon*) **pahangense**, sp. nov. Pl. 6 A. Caulis minutus. Radices sectione transversa triangulares. Inflorescentiae multiflorae; pedunculus filiformis, dense breviter muricatus, apicem versus dilatatus; rachis flexuosa sinuosaque. Bracteae late triangulares, minute muricatae. Flores parvi, vix expansi. Sepala petalaque bene ultra medium adnata, 1–nervia, sepalis lateralibus ad labellum decurrentibus, parte libera haud recurva, carnosa. Sepalum dorsale (parte libera) ellipticum, apice triangulariter incrassato. Sepala lateralia (parte libera) lineari-lanceolata, obtusa. Petala (parte libera) hastato-ovata, subacuta. Labellum 3–lobum, subsaccatum, calcaratum; lobi laterales erecti, brevissimi, lati, rotundati, marginibus anticis lamella V–formi excavationem magnam suborbicularem formante omnino sejunctis; lobus intermedius oblongus, acuminatus, sub apice abrupte angustatus, apice in forma setae brevis incurvo, margines versus valde incrassatus; calcar subtus visum subglobosum, supra et subtus conspicue compressum, intus papillosum. Brachia stigmatis oblonga. Anthera 4–loculata. Pollinia 4, pyriformia vel cuneiformia, inaequalia, stipite brevissimo oblongo, glandula anguste triangulari-ovata.

Stem minute, erect, densely rooting. Roots many, long, appressed to the substratum, triangular in transverse section, pale green, c. 08 cm. diam. Inflorescences erect, many-flowered; peduncle filiform, densely shortly muricate, dilate towards the apex, a tubular sheath at the base and another about the middle, green, .40–1 cm. long; rachis flexuous and sinuous, up to c. 1.50 cm. long, internodes .04–.20 cm. long. Bracts alternate appressed to the pedicel and ovary, broadly triangular, highly convex, minutely muricate, green, c. .05 cm. long. Flowers small, scarcely expanded, appearing in succession, usually 2 open at the same time, lasting for more than 1 day, pale yellow-green or greenish, .19–.21 cm. long to the tip of the spur. Sepals and petals adnate to beyond the middle into a tube, 1–nerved, the lateral sepals adnate to the lip, free part not recurved fleshy. Upper sepal in all c. .17 cm. long free part elliptic, apex thickened triangular c. .075 cm. long. Lateral sepals in all c. .15 cm. long, free part linear-lanceolate, obtuse, c. .06 cm. long. Petals in all c. .14 cm. long, free part hastate-ovate subacute c. .05 cm. long. Lip 3–lobed, subsaccate, spurred, without the spur c. .14 cm. long, c. .07 cm. wide; side lobes erect, very short, broad, rounded, anterior margins joined by a transverse broadly V–shaped lamella enclosing a large suborbicular subsaccate excavation at the base of the blade; midlobe oblong, acuminate, abruptly narrowed below the apex, the apex itself about rightangularly incurved in the form of a short curved spine, very fleshy, margins much thickened rounded, c. .10 cm. long, c. .06 cm. wide; spur subglobose as seen from beneath, much flattened above and below, papillose inside, c. .07 cm. long, the mouth closed by a perforated membrane. Column short, stigmatic arms oblong. Anther 4–celled, anterior pair oblong separated by a groove and separated by a wide transverse groove from the suborbicular smaller decurved posterior pair, white. Pollinia 4, the anterior pair usually larger but sometimes all unequal, cuneate to pyriform, flattened inside, convex or arched outside, pale yellow, caudicle very short oblong, disc narrowly triangular-ovate. Ovary 6–grooved, c. .10 cm. long, pedicel terete c. .04 cm. long.

Pahang, Sat river at about 400 feet altitude on *Dipterocarpus oblongifolius*.

This curious little species is at once characterised by the subsaccate area at the base of the blade of the lip. The spine-like process of the lip common to most species of the section is situate at the very apex which is incurved at right angles to the blade.

Described from living plants.

2. **Taeniophyllum** (§*Sepalocodon*) **viride**, sp. nov. Pl. 6 B. Caulis tenuis. Radices elongati, angusti, sectione transvera triangulares. Inflorescentiae multiflorae, pedunculo filiformi, rachide flexuosa sinuosaque. Bracteae alternatim bifariae, triangulares vel ovatotriangulares. Flores parvi. Sepala petalaque 1–nervia, basi adnata, sepalis lateralibus ad labellum decurrentibus. Sepala (parte libera) lineari-lanceolata, obtusa. Petala (parte libera) ovato-lanceolata, acuminata, acuta. Labellum 3–lobum, calcaratum; lobi laterales erecti, ambitu triangulares, obtusi, marginibus anticis lamella transversa erosa excavationem suborbicularem formante conspicue sejunctis; lobus intermedius subulatus, apicem versus in setam incurvam praesertim denticulatam instructus; calcar subglobosum, eglandulosum. Gynostemium breve, brachiis stigmatis oblongis obtusis. Anthera 4–loculata, loculis anticis ovalibus quam loculas posticas suborbiculares majoribus. Pollinia 4, ovata, intus compressa, inaequalia, anticis minoribus, stipite parvo oblongo, glandula triangulari-ovata.

Stem rather slender, densely rooting, up to c. .50 cm. long. Roots elongate, narrow, triangular in transverse section, grey-green, c. .08 to .10 cm. wide, c. .04 cm. thick. Inflorescences erect, many-flowered, peduncle filiform dilate upwards bright green up to c. 1 cm. long, rachis flexuous sinuous up to c. .70 cm. long, internodes c. .05 cm. long. Flowers appearing singly at intervals opening in the evening and lasting 1 night, well expanded, greenish white, c. .25 cm. long, c. .20 cm. across. Sepals and petals adnate at base into a tube c. .10 cm. long, 1–nerved, the lateral sepals shortly adnate to the lip, the free parts recurved spreading. Free part of sepals linear-lanceolate, obtuse, c. .20 cm. long, c. .06 cm. wide. Free part of petals ovate-lanceolate, acute, c. .15 cm. long, c. .05 cm. wide. Lip 3–lobed, spurred, spread out c. .20 cm. long, across the side lobes c. .15 cm. wide; side lobes erect, roundly triangular, obtuse, the anterior margins joined by a transverse erose lamella enclosing a suborbicular excavation at the base of the lip, c. .03 cm. long, c. .05 cm. wide; midlobe subulate, acute, bearing towards the fleshy apex an incurved sometimes minutely toothed spine c. .05 to .075 cm. long, c. .15 cm. long, c. .05 cm. wide; spur subglobose, gland 0, c. .07 cm. long. Column short, green, stigmatic arms oblong obtuse parallel projecting down into the excavation at the base of the lip. Anther 4–celled, the anterior cells oval larger than the suborbicular decurved posterior ones, apex truncate. Pollinia 4, ovate, flattened inside, unequal, the anterior pair smaller, yellow, caudicle small oblong white, disc triangular-ovate white.

Pahang, Tembeling, common on trees or on dead branches and twigs upon the ground.

This plant is an ally of *T. tenerrimum*, J. J. S. from Java but differs apparently in the structure of petals and lip and the absence of appendages at the base of the bracts.

Described from living plants.

3. **Taeniophyllum** (§*Sepalocodon*) **rubrum**, Ridl. in Journ. Linn. Soc. xxxii. 363; Mat. 1. 174; Fl. Mal. Pen. iv. 177. Pl. 7 A.

Pahang, Tembeling, not uncommon. A pretty little plant with pink flowers lasting for several days. It is free flowering, each inflorescence lasting for many months.

4. **Taeniophyllum** (§*Sepalocodon*) **tjibodasanum**, J.J.S. in Fedde Repert. xxix. (1931) 251. Pl. 7 B.

Pahang, Fraser Hill at an altitude of 4,000 feet, common on small trees and vines in the forest.

The greenish white flowers resemble those of *T. viride*, Carr but it differs in the stouter terete roots, the larger flowers, the sepals and petals being adnate to about the middle, the entire transverse lamella of the lip and the spur papillose inside with a gland near the apex.

Moreover the flowers last for more than 1 night.

Distribution:— Java.

5. **Taeniophyllum** (§*Sepalocodon*) **campanulatum**, sp. nov. Pl. 8 A. Caulis brevis. Radices elongati. Inflorescentiae multiflorae. Bracteae alternatim bifariae, triangulari-ovatae, acutae. Flores campanulati. Sepala petalaque bene ultra medium adnata, 1–nervia, sepalis lateralibus ad labellum decurrentibus, sepalis (parte libera) triangularibus obtusis, petalis (parte libera) triangulariovatis obtusis. Labellum 3–lobum, calcaratum; lobi laterales brevissimi, lati, ambitu triangulares, obtusi; lobus intermedius ovato-lanceolatus, apice in dentem parvum rectangulariter incurvo; calcar subtus visum ovatum, a latere visum subglobosum, intus dense papillosum apice glandula parva ornatum, fauce membrana clauso. Brachia stigmatis oblonga, obtusa. Anthera 4–loculata. Polinia 4, pyriformia, stipite oblongo apicem versus spathulatim dilatato, glandula late elliptica.

Stem short. Roots elongate, fleshy, appressed to the substratum, flattened above and beneath, grey-green, .07 to .15 cm. diam. Inflorescences erect or erecto-patent, many-flowered, peduncle filiform thickened upwards .30–.60 cm. long, rachis flexuous sinuous c. .30 cm. long. Bracts alternate, triangular-ovate, acute. Flowers appearing 1–2

together at short intervals and lasting more than 1 day, campanulate, whitish, .35–.42 cm. long. Sepals and petals adnate to well beyond the middle into a tube, 1–nerved, outside subverruculose, in texture rather fleshy, lateral sepals adnate to the lip, in all .25–.30 cm. long, free parts hardly expanded almost parallel. Free part of sepals triangular, obtuse, c. .10 cm. long c. .09 cm. wide. Free part of petals triangular-ovate, obtuse, c. .09 cm. long and as wide. Lip 3–lobed spurred, spread out without the spur c. .24–.28 cm. long, c. .11–.13 cm. wide across the side lobes; side lobes erect, very short, broad, roundly triangular, obtuse, fleshy, c. .02 cm. long, c. .10 cm. wide, a transverse lamella at the base of the anterior margins produced at the apex in the form of a V enclosing an excavation at the base of the blade; midlobe ovate-lanceolate, apex rightangularly incurved in the form of a small erect tooth, concave inside .14–.18 cm. long; spur as seen from below ovate, as seen from the side subglobose, inside densely papillose with a swollen gland at the tip, the mouth closed by a perforated membrane, c. .10–.12 cm. long. Column very short, green, c. .05 cm. long, stigmatic arms oblong obtuse. Anther 4–celled, the oblong anterior cells much larger than the suborbicular posterior ones, white, c. .04 cm. long. Pollinia 4, pyriform, equal, yellow, caudicle oblong spathulately dilate towards the apex white, disc broadly elliptic white. Ovary 6–grooved.

Pahang, Fraser Hill at 4,000 feet altitude.

This plant is allied to *T. proliferum*, J.J.S. from Java but differs in the more slender shorter rachis and the distinctly 3–lobed lip with the much shorter apical appendage reduced to a short tooth.

Described from living plants.

6. **Taeniophyllum** (§*Sepalocodon*) **Stella,** sp. nov. Pl. 8 B. Caulis, brevis, validus. Radices elongati, valde complanati, tenues, taeniaeformes. Inflorescentiae multiflorae pedunculo terete brevissime muriculato, rachide erecta flexuosave sinuosa lateribus minute muriculata intus complanata vel canaliculata. Bracteae alternatim bifariae, ovato-triangulares, acute apiculatae extus minute muriculatae. Flores majusculi. Sepala petalaque 1–nervia, basi adnata, sepalis lateralibus ad labellum decurrentibus. Sepalum dorsale (parte libera) subulatum, acutum. Sepala lateralia (parte libera) subulata, acuta subacutave. Petala (parte libera) linearilanceolata, acuta. Labellum integrum, calcaratum; lamina rhombeo-lanceolata, acuminata, acuta, super basin in membranam transversam horizontalem apicem versus V–formem excavationem sub-

quadratam formans elevata, super excavationem vix usque ad apicem carinata, apice leviter lateraliter compresso esetifero; calcar subtus visum subglobosum vel triangulari-ovatum, obtusissimum, supra subtusque compressum, intus minute papillosum, fauce lamella transversa vix omnino clauso. Gynostemium breve, rectum, brachiis stigmatis oblongis obtusis. Polinia 4, pyriformia, stipite oblongo apicem versus spathulatim dilatato, glandula ovali.

Stem short, stout, densely rooting, up to c. .60 cm. long. Roots elongate, appressed to the substratum, strongly flattened above and beneath, thin, ribbon-like, rather shiny dark green above, much paler beneath, c. .13–.30 cm. wide, c. .05 cm. thick. Inflorescences erect, many-flowered; peduncle terete, thickened upwards with 1 or 2 small sheaths at the base and another some distance above, very shortly muriculate, dark green, .40–.80 cm. long; rachis erect or flexuous, sinuous, sides minutely muriculate, flattened or grooved inside, dark green, .30–.50 cm. long, internodes c. .10 cm. long. Bracts alternate, appressed to the pedicel, ovate-triangular, acutely apiculate, inside concave, outside convex minutely muriculate, dark green, c. .07 cm. long and as broad. Flowers appearing singly or in pairs at intervals, opening in the evening and lasting one night, .90–1.25 cm. long to end of spur, .80–1 cm. wide, pale yellowish white to bright yellow or salmon pink. Sepals and petals 1–nerved, adnate at base in the form of a tube for c. .17 cm. free part strongly recurved spreading, tubular part slightly dilate in the middle. Free part of dorsal sepal subulate, acute, c. .55 cm. long, c. .10 cm. wide. Lateral sepals adnate to the lip at the entrance to the spur, free part subulate acute or subacute c. .50 cm. long c. .15 cm. wide. Free part of petals linear-lanceolate, acute, c. .50 cm. long, c. .09 cm. wide. Lip entire, spurred, blade rhombeolanceolate, acuminate, acute, concave inside, a transverse horizontal lamella above the base produced in the form of a V at its apex and enclosing a subquadrate excavation at the base of the blade, keeled from above the excavation to below the apex, rather thickened and laterally flattened towards the apex, seta 0 or represented by a minute tooth, c. .70 cm. long, c. 18 cm. wide; spur seen from beneath subglobose or triangular-ovate, very obtuse, rather flattened above and beneath, inside minutely papillose gland 0, mouth almost closed by a transverse lamella, c. .10 cm. long, c. as broad, c. .04 cm. thick. Column short, straight, green, stigmatic arms parallel oblong obtuse projecting down into the excavation at the base of the lip. Anther 4–celled, the posterior cells recurved smaller, grooved above between the cells, apex produced to a short truncate or retuse beak,

white. Pollinia 4 pyriform, flattened inside, yellow, caudicle oblong spathulately dilate towards the apex white, disc oval white.

Pahang, Tembeling.

This is an ally of *T. radiatum*, J.J.S. from Java but is at once distinguished by the absence of an apical seta on the lip. In this respect it resembles *T. esetiferum*, J.J.S. from Borneo but it is a very much larger plant and of quite different structure in regard to the flowers.

Described from living plants.

7. **Taeniophyllum** (§*Sepalocodon*) **intermedium,** sp. nov. Pl. 9 A. Caulis pervalidus. Radices elongati, complanati, taeniaeformes. Inflorescentiae pauciflorae, pedunculo terete apicem versus leviter incrassato brevissime muricato, rachide brevissime muricata. Bracteae alternatim bifariae, ambitu triangulares, acute apiculatae, extus brevissime muriculatae. Flores intervallis singulatim expansi, noctu florentes. Sepala petalaque 1–nervia, basi breviter adnata. Sepala (parte libera) subulata, obtusa. Petala (parte libera) subulata, obtusa. Labellum carnosulum, integrum, calcaratum; lamina subulata, subacuta, sub apice in setam incurvam instructa, basi in lamellam transversam V–formem excavationem triangularem formantem alte elevata; calcar subglobosum. Gynostemium breve, apicem versus dilatatum, brachiis stigmatis longis, lineari-oblongis. Anthera 4–loculata, loculis posticis brevioribus. Pollinia 4, pyriformia, inaequalia, anticis majoribus, stipite oblongo, glandula subquadrata. Ovarium 6–sulcatum, sulcis breviter clavato-pilosis.

Stem rather stout, sometimes branched, densely rooting, up to c. .70 cm. long. Roots elongate, appressed to the substratum, flat, taeniaeform, very slightly rounded above and rather shiny dark green, up to c. .20 cm. wide, c. .05 cm. thick. Inflorescences erect or erecto-patent, few-flowered; peduncle filiform, slightly thickened upwards with 1 or 2 small sheaths at the base and c. 2 at intervals above, very shortly muricate, dark green, 1–2.25 cm. long; rachis as thick as apex of peduncle, erect or flexuous, sinuous, very shortly muricate, dark green, up to c. .75 cm. long, internodes .10 to .17 cm. long. Bracts alternate, base appressed to the pedicel, roundly triangular, acutely apiculate, inside concave, outside convex very shortly muriculate, dark green, c. .07 cm. long and as broad. Flowers appearing singly or in pairs at intervals opening in the evening and lasting 1 night, well expanded, pale salmon pink, c. .50 cm. long. Sepals and petals 1–nerved, shortly adnate at the base into a tube, free part recurved spreading subulate obtuse. Free part of dorsal sepal c. .30 cm. long,

c. .05 cm. wide. Free part of lateral sepals c. .30 cm. long, c. .06 cm. wide. Free part of petals c. .28 cm. long, c. .05 cm. wide. Lip fleshy, entire, spurred; blade subulate, subacute, concave, produced below the apex to an incurved seta c. .08 cm. long, a transverse V–shaped lamella at base forming a triangular excavation at the base of the blade, fully .30 cm. long, c. .10 cm. wide; spur subglobose, the mouth closed by a thin perforated lamella, c. .10 cm. long. Column short, dilate upwards, papillose towards the apex, back produced at apex to a large ovate obtuse fleshy lobe, stigmatic arms long parallel linear-oblong obtuse projecting down into the excavation at the base of the lip, green. Anther 4–celled, anterior cells oblong with a groove between much larger than the suborbicular posterior cells, apex truncate, white. Pollinia, 4, pyriform, unequal, the anterior pair larger, yellow, caudicle oblong white, disc subquadrate white. Ovary 6–grooved with short stout clavate hairs decumbent or suberect in the grooves, green, c. .14 cm. long.

Pahang, Mentakab.

This appears to be an ally of *T. radiatum* J.J.S. from which it differs in the longer peduncle, the smaller flowers and a much longer appendage at the apex of the lip.

8. **Taeniophyllum** (§*Sepalocodon*) **rugulosum,** sp. nov. Pl. 9 B. Caulis pervalidus. Radices elongati, taeniaeformes, supra subtusque valde compressi, supra dense rugulosi. Inflorescentiae erectae, multiflorae, pedunculo elongato filiformi, rachide compressa sinuosa flexuosa. Flores parvi. Sepala petalaque basi brevissime adnata, sepalis lateralibus ad labellum decurrentibus, partibus liberis valde reflexis. Sepala (parte libera), anguste obtusa. Petala (parte libera) lineari-lanceolata, obtusa. Labellum inconspicue 3–lobum, calcaratum, basin versus in lamellam transversam erosulam antice V–formem basi excavationem transversem oblongam formantem alte elevatum; lobi laterales erecti, breves, late rotundati; lobus intermedius subulatus, apice incrassato dentem parvum incurvum ferente; calcar subtus visum subglobosum, a latere visum conicum obtusum, intus papillosum apicem versus fasciam humilem late canaliculatam ferens. Gynostemium breve, brachiis stigmatis oblongis obtusis.

Stem rather stout. Roots elongate, ribbon-like, appressed to the substratum, strongly flattened above and beneath, densely minutely wrinkled dark green above, up to c. .28 cm. wide. Inflorescences erect, many-flowered; peduncle elongate, filiform base sheathed with another spreading sheath about the middle, c. 2–3 cm. long; rachis compressed, dense, flexuous, sinuous, up to c. 1.50 cm. long, internodes

c. .05 cm. long. Bracts alternate, spreading, triangular, acutely apiculate, deeply convex keeled outside, dark green, c. .08 cm. long and as broad. Flowers appearing at intervals 1 or 2 at a time, opening in the evening and lasting 1 night, deep salmon colour. Sepals and petals very shortly adnate at the base, for c. .05 cm., 1–nerved, the lateral sepals shortly adnate to the lip, the free parts strongly reflexed. Free part of sepals subulate, narrowly obtuse, c. .20 cm. long, c. .07 cm. wide. Free part of petals linear-lanceolate, obtuse, c. .18 long, c. .07 cm. wide. lip inconspicuously 3–lobed, spurred, a transversely oblong excavation at the base bounded in front by a transverse minutely erose lamella with a V–form apex, base and side lobes salmon, midlobe much darker, spread out without the spur c. .20 cm. long, c. .13 cm. wide across the side lobes; side lobes short, erect, broadly rounded; midlobe slightly recurved, subulate, a small incurved tooth below the thickened narrowly obtuse apex; spur seen from beneath subglobose, seen from the side conic obtuse, inside minutely papillose with a low broadly grooved cushionlike fascia near the tip, pale salmon pink, c. .06 cm. long. Column short, clinandrium large excavate suborbicular, stigmatic arms oblong slightly narrowed towards the truncate-obtuse recurved apex concave inside. Anther 4–celled, the anterior cells much larger than the posterior, white. Ovary 6–grooved, verrucose and shortly clavate-hairy in the grooves.

Pahang, Sat river at about 400 feet on a *Saraca* tree.

This plant resembles *T. culiciferum*, Ridl. but is readily distinguished by the curiously wrinkled surface of the roots and the alternate bracts.

There is a plant, apparently of this, undetermined in the Royal Botanic Gardens, Kew. It was collected in 1858 by Mr. J. Motley at Bangarmassin in Borneo, No. 626.

Described from spirit material and colour notes.

9. **Taeniophyllum** (§*Mitocaulon*) **culiciferum,** Ridl. Fl. Mal. Pen. iv. (1924) 176. Pl. 10.

Pahang, Tembeling on small trees in the forest. In Pahang this is a common species, second only to *T. obtusum*, Bl. in abundance.

It is a hardy, free flowering plant and distinguished, so far as I know, from all other members of the sub-genus *Codonosepalum*, Schltr. by the fact that the bracts are quaquaversal.

The flowers last for 1 night, opening before dusk and closing in the morning.

10. **Taeniophyllum** (§*Amphilaphes*) **montanum,** sp. nov. Pl. 11 A. Caulis brevis, validus, ad c. .75 cm. longus. Radices elongati, taeniaeformes, carnosuli, ad c. .28 cm. lati. Inflorescentiae multiflorae, pedunculo terete ad c. .50 cm. longo, rachide incrassata sinuosa ad c. 1.50 cm. longa, internodis minutis. Bracteae quaquaversae, breviter late ovatae, acute apiculatae. Sepalum dorsale oblongum, obtusum, extus carinatum. Sepala lateralia calcari adnata, ovata, acuta, basi angustata, extus valde carinata. Petala subfalcata, anguste oblonga, obtusa, extus carinata. Labellum inconspicue 3–lobum, calcaratum, lamina papillosa basi pilosa, lobis lateralibus rotundate triangularibus obtusis papillosis, lobo intermedio brevissimo lato triangulari obtuso. Gynostemium breve, validum, clinandrio excavato, rostello brevi triangulari concavo marginibus incurvis, stigmate reniformi lobis brevibus latis triangularibus.

Stem short, stout, densely rooting, up to c. .75 cm. long. Roots elongate, ribbon-shaped, appressed to the substratum, rather fleshy, dark green above paler beneath, up to c. .28 cm. wide, c. .13 cm. thick. Inflorescences many-flowered, peduncle terete with a small tubular sheath at base and sometimes another higher up c. .50 cm. long, rachis thickened erect or flexuous sinuous up to c. 1.50 cm. long internodes minute. Bracts quaquaversal, appressed to the pedicel, shortly broadly ovate, acutely apiculate, margins minutely toothed, inside deeply concave, outside highly convex keeled towards the apex warty and minutely muricate, dark green, c. .09 cm. long, c. .12 cm. wide. Flowers appearing singly at intervals. Sepals and petals at first bright green turning yellow as they expand. Upper sepal oblong, obtuse, 1–nerved, inside concave, outside convex keeled subverrucose very sparingly clavate-hairy, c. .28 cm. long, c. .13 cm. wide. Lateral sepals adnate to the spur of the lip and very shortly adnate to the column, triangular, acute, base narrowed falcately curved, 1–nerved, inside concave, outside convex strongly keeled subverrucose very sparingly clavate-hairy, c. .28 cm. long, c. .17 cm. wide. Petals subfalcate, narrowly oblong, obtuse, inside concave, outside convex keeled subverrucose very sparingly clavate-hairy, c. .20 cm. long, c. .08 cm. wide. Lip inconspicuously 3–lobed, spurred, blade between the side lobes concave 9–nerved papillose hairy at the base, white, spread out c. .46 cm. long, c. .33 cm. wide across the side lobes, side lobes erect roundly triangular obtuse papillose, midlobe very short broad roundly triangular obtuse papillose, spur cylindric straight slightly dilate towards the obtuse apex keeled above flattened rather concave beneath inside papillose hairy at the mouth c. .25 cm. long. Column fairly stout, clinandrium

excavate, rostellum short triangular concave margins incurved, stigma large reniform the lobes short broad triangular, the whole c. .10 cm. tall. Anther 2–celled cells oblong partly closed at the base by a small triangular lamella, seen from above suborbicular grooved the apex produced to a quadrate truncate beak, the whole c. 12 cm. long, c. .10 cm. wide. Pollinia 4, yellow, caudicle linear white c. .05 cm. long, disc oblong obtuse from the triangular base c. 0.25 cm. long c. .20 cm. wide. Ovary 6–grooved, green, c. .25 cm. long, pedicel terete c. .15 cm. long. Capsule cylindric, warty, dark green, c. 1.90 cm. long, c. .40 cm. diam., pedicel c. .25 cm. long c. .10 cm. diam.

Pahang, Fraser Hill at c. 4,000 feet altitude, not uncommon.

This plant is well distinguished by the fact that the bracts are not alternate.

Described from spirit material and colour notes.

11. **Taeniophyllum** (§*Amphilaphes*) **micranthum**, sp. nov. Pl. 11 B. Caulis validus. Radices elongati, supra rotundati, subtus complanati. Inflorescentiae erectae flexuosaeve, pedunculo terete minute muricato, rachide incrassata compressa dense multiflora. Bracteae quaquaversae, triangulares, acutae, extus carinatae minute muricatae. Flores minuti, albi, haud expansi. Sepalum dorsale oblongo-lanceolatum, obtusissimum vel truncatum. Sepala lateralia ovato-lanceolata, obtusissima truncatave. Petala elliptica, obtusa. Labellum integrum, carnosulum, calcaratum; lamina obovata, apici in tuberculam parvam conicam producta, subtus carinata, marginibus erectis; calcar conicum, subapice obtuso paulo angustatum, dorso sensim compressum, lateribus leviter dilatatis. Gynostemium brevissimum. Anthera oblonga. Pollinia 4, pyriformia.

Stem stout, densely rooting, up to c. .70 cm. long. Roots elongate, appressed to the substratum, fleshy rounded above, flattened beneath, green, up to c. .18 cm. wide, c. .08 cm. thick. Inflorescences erect or flexuous shortly densely many-flowered; peduncle terete, thickened upwards, glabrous, 1 or 2 very small appressed triangular sheaths at base and 1 or 2 bracteiform above, green, up to c. .70 cm. long; rachis thickened, compressed, dense, up to c. .35 cm. long, internodes minute. Bracts quaquaversal, spreading scarcely appressed to the pedicel triangular, acute, inside concave, outside convex keeled minutely muricate, green c. .08 cm. long, c. .10 cm. wide. Flowers appearing singly in succession, the second opening as the first withers, lasting several days, not expanding, minute, white, c. .15

cm. long, c. .10 cm. wide. Upper sepal oblong-lanceolate, apex very obtuse or truncate, 1–nerved, inside concave, outside convex conspicuously keeled sparsely verrucose, c. .10 cm. long, c. .05 cm. wide. Lateral sepals running down the lip, ovate-lanceolate, very obtuse or truncate, 1–nerved, inside deeply concave, outside highly convex conspicuously keeled sparsely verrucose, c. .10 cm. long, c. .05 cm. wide. Petals elliptic, obtuse, 1–nerved, sometimes minutely erose, c. .09 cm. long, c. .035 cm. wide. Lip porrect, entire, rather fleshy, spurred, including the spur up to c. .13 cm. long; blade obovate with a small conic tubercle at the apex, margins erect, inside concave, outside conspicuously keeled, c. .08 cm. long and as broad; spur conic narrowed beneath below the obtuse apex, rather flattened on the back, sides dilate in the form of a rather wide keel, papillose inside, c. .05 cm. long. Column very short, forming an obtuse angle with the ovary. Anther oblong 2–celled, white. Pollinia 4, pyriform, flattened beneath, bright yellow, caudicle oblong white, disc oval white. Ovary 6–grooved, c. .06 cm. long.

Pahang, Fraser Hill at c. 4,000 feet altitude.

A very distinct member of the section on account of the very small size of the flowers, the curious thickened compressed and dense rachis and the bracts which are quaquaversal. The flowers open in steady sequence there being always two open at the same time.

Described from the living plant and spirit material.

12. **Taeniophyllum** (§*Brachyanthera*) **obtusum,** Bl. Bijdr. 357; Lndl. Gen. and Sp. Orch. 226; Miq. Fl. Ind. Bat. III. 685; J.J.S. Fl. Buit. vi. (Orch.) 625, Atlas CDLXIX: *T. Zollingeri,* Rchb. f. Bonpl.. 1857, 41; Xen. Orch. 202, t. 77, I, II.

T. Serrula, Hook. f. should be noted as a synonym. This is a very common plant throughout the Peninsula.

13. **Taeniophyllum** (§*Brachyanthera*) **calceolus,** sp. nov. Pl. 12 B. Caulis validus. Radices elongati, supra et subtus compressi. Inflorescentiae validae, multiflorae, pedunculo brevissimo, rachide flexuosa sinuosa. Bracteae alternatim bifariae, late ovatae, acute apiculatae. Sepalum dorsale oblongo-ellipticum, obtusum. Sepala lateralia labello breviter adnata e basi subunguiculata falcate ovata, acuta. Petala e basi lineari falcate oblanceolata, obtusa. Labellum 3–lobum, calcaratum; lobi laterales ambitu triangulares, obtusi; lobus intermedius ambitu triangularis, intus profunde concavus, apice incurvo in tuberculam inconspicuam conicem elevato; calcar conicum, obtusum. Gynostemium breve, latum, clinandrio excavato ovato, rostello

triangulari, brachiis stigmatis magnis rotundatis. Anthera 2–loculata, obovata, basi acuta, apice in rostrum subquadratum producto. Pollinia 4, pyriformia, stipite e basi anguste lineari apicem versus late spathulatim dilatata, glandula ovali. Ovarium 6–sulcatum, brevissime laxe clavato-pilosum.

Stem stout, sometimes branched, densely rooting, up to 1.75 cm. long. Roots as in *T. obtusum*. Bl. elongate, stout, appressed to the substratum, flattened above and beneath, grey-green, up to c. .32 cm. wide, c. .15 cm. through. Inflorescences stout, many-flowered, peduncle terete c. .20 cm. long, rachis flexuous sinuous minutely muriculate up to c. 2.50 cm. long internodes c. .175 cm. long. Bracts alternate, broadly ovate, acutely apiculate, inside deeply concave, outside highly convex conspicuously keeled minutely muriculate, dark green suffused orange-brown when old, c. .15 cm. long and as broad. Flowers appearing 1 or 2 at a time and lasting 1 day, well expanded, c. .45 wide and as long. Sepals and petals bright yellow, darker towards the apex. Dorsal sepal incurved about the middle, oblong-elliptic, obtuse, 3–nerved, inside concave, outside convex keeled, c. .35 cm. long, c. .15 cm. wide. Lateral sepals very shortly adnate to the lip, falcately ovate from the subunguiculate base, acute, or very shortly acutely apiculate, 3–nerved, inside cave, outside highly convex strongly keeled, c. .33 cm. long, c. .17 cm. wide. Petals falcately oblanceolate from the linear base, obtuse, 1–nerved, distinctly incurved from about the middle, inside concave, outside convex, c. .30 cm. long, c. .13 cm. wide. Lip adnate to the column and shortly to the lateral sepals, 3–lobed, spurred, blade between side lobes fleshy with a deep median groove, white with a purple spot on each side in the sinus of the lobes, spur bright yellow, spread out including the spur c. .43 cm. long, c. .28 cm. wide across the side lobes; side lobes erect, roundly triangular, obtuse; midlobe roundly triangular, inside deeply concave, apex fleshy incurved and elevate in the form of an inconspicuous conic tubercle; spur conic, obtuse, curved, c. .20 cm. long. Column white with a purple spot on each side of the upper margin and a pale purple spot on each side of the lower margin of the stigma, c. .12 cm. long, c. .17 cm. wide, clinandrium excavate ovate, rostellum triangular, stigmatic arms large suborbicular concave inside. Anther 2–celled, obovate, base acute, cream, apex produced to a subquadrate purple beak, the whole c. .16 cm. long. Pollinia 4, pyriform bright yellow, caudicle towards the apex apathulately dilate from a narrowly linear base white, disc small oval white, the whole c. .10 cm. long. Ovary 6–grooved, shortly laxly clavate-hairy.

Perlis, coll. Henderson, no. A 619.

This is a close ally of *T. obtusum* Bl. but is a much larger plant with stouter more lax inflorescence, larger flowers with a distinctly 3–lobed lip which is deeply concave with a strongly incurved conic apex.

Described from living plants in cultivation, H. B. Singapore.

14. **Taeniophyllum** (§*Brachyanthera*) **pallidiflorum**, sp. nov. Caulis brevis, ad c. .50 cm. longus. Radices elongati, complanati taeniaeformes subcylindricive, ad c. .20 cm. lati. Inflorescentiae c. 20–florae, pedunculo .20–.60 cm. longo, rachide erecta flexuosave sinuosa ad c. 2 cm. longa. Bracteae alternatae, adpressae, triangulares, acute apiculatae, extus papilloso-verrucosae. Sepalum dorsale ovato-oblongum, truncatum, apici minute erosulum, extus verrucosum carinatum. Sepala lateralia late ovata, anguste obtusa, apici minute erosula, margine antico super basin rotundate dilatato, extus carinata sparse verrucosa. Petala subfalcata lanceolato-oblonga, acuminata, obtusa, apici minute erosula, extus carinata subverrucosa. Labellum inconspicue 3–lobum, calcaratum, lamina inter lobos laterales concava subtus complanata, lobis lateralibus brevissimis triangularibus acutis tenuibus erectis, lobo intermedio crasse carnoso triangulari-ovato obtuso basi breviter canaliculato, calcare cylindrico apicem versus dilatato supra subtusque complanato sulcis 3 donato extus sparse clavato-piloso intus faucem prope piloso. Gynostemium breve, latum, validum, lobis stigmatis brevibus latis truncatis.

Stem short, fairly slender, densely rooting, up to c. .50 cm. long. Roots elongate, flattened ribbon-like or subcylindric, up to c. .20 cm. wide, .05–.10 cm. diam. Inflorescences c. 20–flowered, peduncle .20–.60 cm. long, rachis erect or flexuous, sinuous, up to c. 2 cm. long, internodes .10–.15 cm. long. Bracts alternate, appressed to the pedicel, triangular, acutely apiculate, highly convex papillose-verrucose outside, dark green. Flowers appearing singly at intervals and lasting 1 day, well expanded. Sepals and petals semitransparently pale whitish yellow, petals paler. Dorsal sepal ovate-oblong, apex truncate minutely erosulous, inside concave, outside convex warty with a conspicuous median keel produced slightly beyond the apex, .22–.27 cm. long, .12–.17 cm. wide. Lateral sepals broadly ovate, apex narrowly obtuse minutely erose, anterior margin conspicuously roundly dilate above the base, inside concave, outside convex sparsely warty with a very conspicuous median keel, .20–.25 cm. long, .13–.18 cm. wide. Petals subfalcate, lanceolate-oblong, acuminate, apex obtuse minutely erose, posterior margin slightly dilate above the base, inside concave, outside convex subverrucose conspicuously keeled, .22–.25 cm. long,

.12–.17 cm. wide. Lip inconspicuously 3–lobed, spurred, blade between the side lobes deeply concave flattened beneath or slightly concave, pale yellowish white, spread out c. .40 cm. long, c. .20 cm. wide across the side lobes, side lobes erect very short triangular obtuse very thin in texture, midlobe thickly fleshy elevate triangular-ovate obtuse, a short median groove at base; spur longer than the blade, cylindric, clavate-dilate towards the obtuse apex, flattened above and beneath with 3 longitudinal grooves, outside sparsely clavate-hairy, inside hairy at the mouth, c. .25 cm. long. Column short stout, whitish, c. .07 cm. long, clinandrium a little excavate transversely oblong, rostellum triangular obtuse apex upcurved concave above convex beneath, stigma large rather excavate reniform produced upwards on each side of the rostellum the lobes short broad truncate. Anther 2–celled the cells partly closed by a suborbicular lamella, seen from above transversely oblong base shortly grooved, abruptly dilate infront to an oblong truncate beak concave inside. Pollinia 4, oval-pyriform, rather flattened and concave below, yellow, caudicle linear white, disc shortly oblong. Ovary 6–grooved, rather densely clavate-hairy in the grooves, green, with the pedicel c. .30 cm. long.

Pahang, Tahan river, altitude c. 400 feet.

A close ally of *T. annuliferum*, Carr, it is a more slender plant and differs in the structure of the lip and in the colour of the flowers.

Described from plants preserved in spirit, and colour notes.

15. **Taeniophyllum** (§*Brachyanthera*) **annuliferum**, sp. nov. Pl. 13 A. Caulis validus, ad c. 1.50 cm. longus. Radices elongati, leviter complanati subcylindricive, ad c. .25 cm. lati. Inflorescentiae breves, pauciflorae. Bracteae alternatae, triangulares, acute apiculatae. Sepalum dorsale oblongo-ellipticum, anguste obtusum, apice interdum denticulato. Sepala lateralia basi calcari labelli brevissime adnata, ovata, obtusa, margine antico basi rotundate dilatato. Petala oblongo-lanceolata, anguste obtusa, apice interdum denticulato. Labellum apici inconspicue 3–lobum, calcaratum, lamina concava dense pilosa, lobis lateralibus triangularibus truncatis, lobo intermedio brevi lato ambitu triangulari obtuso, calcare subcylindrico lateribus late dilatato subtus complanato extus sparse clavato-piloso intus fauce papilloso. Gynostemium breve, validum, rostello decurvo triangulari anguste obtuso, lobis stigmatis brevibus latis rotundatis.

Stem stout, densely rooting, up to c. 1.50 cm. long. Roots elongate, fairly stout, fleshy, rather flattened or subcylindric, light green, up to c. .25 cm. wide, .07–.13 cm. diam.

Inflorescences short, few-flowered, peduncle minute, rachis thickened sinuous. Bracts alternate, appressed to the pedicel, triangular, acutely apiculate, outside highly convex minutely papillose-verrucose, dark green, c. .10 cm. long. Flowers appearing singly at intervals and lasting 1 day, widely expanded, .50–.68 cm. long, .40–.50 cm. wide. Sepals and petals spreading, semitransparently yellow or ochreous. Upper sepal oblong-elliptic, apex narrowly obtuse sometimes minutely toothed, inside concave, outside convex sparsely warty with an elevate median keel, c. .25 cm. long, c. .15 cm. wide. Lateral sepals slightly adnate at base to the spur of the lip, ovate, obtuse, anterior margin roundly dilate at base, inside deeply concave, outside convex warty with a conspicuously elevate median keel, c. .25 cm. long, c. .15 cm. wide. Petals oblong-lanceolate, narrowly obtuse, apex sometimes minutely toothed, inside concave, outside convex with a median keel, c. .22 cm. long, c. .07 cm. wide. Lip inconspicuously 3–lobed at apex, spurred, blade concave densely hairy pale yellow the spur ochre-yellow, spread out .50–.68 cm. long, c. .20 cm. wide across the side lobes, side lobes erect triangular truncate, midlobe short broad roundly triangular obtuse, spur subcylindric with dilate sides flattened beneath outside sparsely clavate-hairy inside papillose at the mouth .27–.36 cm. long. Column short, stout whitish with a pale purple line along the margins towards apex, c. .09 cm. long, rostellum decurved triangular narrowly obtuse, lobes of the stigma short broad rounded. Anther 2–celled, cells large oblong partly closed at base by a small subor-bicular lamella, seen from above broadly ovate with a short groove at the base, apex abruptly narrowed to a subquadrate truncate beak, ochre with a dark red ring round the margin, beak white. Ovary 6–grooved, furfuraceo-punctate, with pedicel c. .30 cm. long.

Kelantan, Gua Musang, altitude c. 500 feet.

Described from plants preserved in spirit and colour notes.

16. **Taeniophyllum** (§*Rhyncanthera*) **filiforme**, J.J.S. in Bull. Inst. Bot. Buit. n. 7; Ic. Bog. II, 127, t. CXXV B.; Fl. Buit. vi (Orch.) 623, Atlas CDLXVII. Pl. 13 B.

T. macrorrhizum, Ridl. should be noted as a synonym.

Pahang, Mentakab. This plant, which is not uncommon, is at present our only representative of the section *Rhyncanthera*.

It is interesting from the fact that many of the roots grow more or less erect and make no effort to gain contact with the substratum. The pneumathodes are clearly visible as two rows of oblong white dots on the under-surface of the roots as in *T. pallidiflorum*, Carr.

17. **Taeniophyllum** (§*Dichanthera*) **rostratum,** sp. nov. Pl. 14. Caulis validus, praesertim ramosus. Radices elongati, validi, teretes. Inflorescentiae multiflorae, pedunculo valido brevissimo, rachide flexuosa sinuosaque. Bracteae adpressae, late triangulares, breviter acuminatae, acutae. Flores parvi, bene expansi. Sepala petalaque intus sparse extus dense pubescentia, marginibus ciliatis. Sepalum dorsale oblongum, medio fere subulato-acuminatum, acutum. Sepala lateralia subsigmoidee falcata, linearilanceolata, acuta. Petala falcata, linearia, apicem obtusum versus leviter angustata. Labellum 3–lobum, calcaratum; lobi laterales suberecti, magni, suborbiculares; lobus intermedius brevissimus, triangularis ovatus, obtusus; calcar oblongum, obtusum, extus breviter pilosum, intus faucem versus longe apicem versus breviter pilosum. Gynostemium brevissimum, validum, brachiis stigmatis ovato-oblongis obtusis. Anthera 2–loculata, transverse oblonga, antice in rostrum magnum ovato-lanceolatum obtusum angustata. Pollinia 4, pyriformia, stipite oblanceolato, glandula ovali. Ovarium 6–sulcatum cum pedicello dense muricatum.

Stem very stout, sometimes branched, densely rooting up to c. 1.75 cm. long. Roots appressed to the substratum, elongate, terete, stout, fleshy, slightly flattened beneath, dark grey-green, up to c. .30 cm. diam. Inflorescences rather many-flowered, peduncle stout very short covered with muricate sheaths up to c. .15 cm. long, rachis flexuous sinuous muricate up to c. 1.20 cm. long internodes up to c. .10 cm. long. Bracts alternate, appressed to the pedicel, broadly triangular, shortly acuminate, acute, fleshy, inside deeply concave, outside highly convex keeled towards the apex densely muricate, dark green, c. .15 cm. long, c. .27 cm. wide at the base. Flowers appearing singly at intervals, rather small well expanded. Sepals and petals reflexed from above the base, margins ciliate, inside sparsely outside rather densely pubescent, pale yellow. Dorsal sepal strongly reflexed with the back almost touching the ovary, oblong, subulate-acuminate from about the middle, acute, 3–nerved, inside concave, outside convex strongly keeled, c. .35 cm. long, c. .13 cm. wide. Lateral sepals not adnate to the lip, sigmoidly falcate, linear-lanceolate, acute, 1–nerved, inside concave, outside convex strongly keeled, c. .25 cm. long, c. .10 cm. wide. Petals falcate, linear, slightly narrowed towards the obtuse apex, 1–nerved, inside concave, outside convex keeled, c. .28 cm. long, c. .08 cm. wide. Lip 3–lobed, spurred, rather recurved towards the apex, white, spur yellow, spread out c. .28 cm. long including the spur, c. .25 cm. wide across the side lobes; side lobes suberect, large, suborbicular, many-nerved, hairy at the base, c. .11 cm. across; midlobe very short, triangular-ovate, obtuse,

c. .03 cm. long and as broad, sinus between the lobes ciliate; spur oblong, slightly dilate towards the obtuse tip, outside shortly hairy, inside densely long-hairy near the mouth with a few short hairs towards the tip, c. .16 cm. long. Column very short, stout, green clinandrium excavate ovate, rostellum produced to a triangular acuminate acute beak, stigmatic arms ovate-oblong obtuse. Anther 2–celled with a low septum in each cell, transversely oblong, grooved above, abruptly narrowed to the beak and separated from it by a transverse groove, pale yellow, without the beak c. .06 cm. long, c. .08 cm. wide; beak dilate at the base, ovate-lanceolate, obtuse, margins few-toothed triangularly dilate below the apex, convex above, concave below, pale yellow-green, c. .12 cm. long. Pollinia 4, pyriform, equal, flattened below, shortly grooved above the base, bright yellow, c. .05 cm. long, filaments bright yellow highly elastic, caudicle oblanceolate apex strongly recurved white, disc oval yellowish. Ovary 6–grooved with the pedicel densely muricate.

Pahang, Tembeling on a fallen and decaying branch in the forest. Described from the living plant.

Plate 6 Fig. A. **Taeniophyllum pahangense**, Carr

a Plant.
b. Flower.
c. Sepals and Petals.
d. Lip, spread out.
e. Lip, from the side.
f. Anther.
g. Pollinia, from the side.
h. Pollinia, from above.
i. Pollinia, from beneath.
j. 1 Pollinium.

a. Natural size. Remainder enlarged.

Fig. B. **Taeniophyllum viride**, Carr

a. Plant.
b. Flower, in section.
c. Sepals and Petals.
d. Lip, spread out.
e. Anther.
f. Anther, from the side.
g. Pollinia.

a. Natural size. Remainder enlarged.

Plate 7 Fig. A. **Taeniophyllum rubrum**, Ridl.

a. Plant.
b. Flower, in section.
c. Sepals and Petals.
d. Lip, spread out.
e. Pollinia.

a. Natural size. Remainder enlarged.

Fig. B. **Taeniophyllum tjibodasanum**, J.J.S.

a. Flower.
b Sepals and Petals.
c. Lip, spread out.
d Anther, from beneath.
e 1 Pollinium.
All enlarged.

Plate 8 Fig. A. **Taeniophyllum campanulatum**, Carr

a Plant.
b. Sepals and Petals.
c Lip, spread out.
d. Lip, from the side.
e Column and anther.
f. Ditto.
g. Anther, from above.
h. Anther, from beneath.
i. Pollinia, from above.
j. Pollinia, from beneath.

a. Natural size. Remainder enlarged.

Fig. B. **Taeniophyllum Stella**, Carr

a. Plant.
c. Flower.
d. Sepals and Petals.
e. Lip, spread out.
f. Anther, from the side.
g. Anther, from above.
h. Anther, from beneath.
i, j, k. Pollinia
a. Natural size. Remainder enlarged.

Plate 9 Fig. A. **Taeniophyllum intermedium**, Carr

a Flower, in section.
b. Sepals and Petals.
c. Lip, in section.
d. Lip, spread out.
e. f. Column.
g, h. Anther.
i, j, k. Pollinia.
All enlarged.

Fig. B. **Taeniophyllum rugulosum**, Carr

a Plant.
b Flower.
c. Sepals and Petals.
d. Lip, spread out.
e. Lip, from the side.
g. Column.
h. Section through the spur.
a. Natural size. Remainder enlarged.

Plate 10 **Taeniophyllum culiciferum**, Ridl.

a. Plant.
b. Sepals and Petals.
c. Lip, spread out.
d. Apex of lip.
e. Column and base of lip, in section.
f. Anther.
g. Pollinia.
a. Natural size. Remainder enlarged.

Plate 11 Fig. A. **Taeniophyllum montanum**, Carr

a. Flower.
b. Dorsal sepal.
c. Lateral sepal.
d. Petal.
e. Lip.
f. Column.
g. Anther.
h. Pollinia.
All enlarged.

Fig. B. **Taeniophyllum micranthum**, Carr

a. Plant.
b. Flower.
c. Dorsal sepal.
d. Lateral sepal.
e. Petal.
f. Lip.
g. Flower, from the side.
h. Lip and Column.
i. Lip and Column, from the side.
j. Anther, from beneath.
k. 2 Pollinia.

a. Natural size. Remainder enlarged.

Plate 12 Fig. A. **Taeniophyllum pallidiflorum**, Carr

a. Plant.
b. Flower.
c. Flower, in section.
d. Dorsal sepal.
e. Lateral sepal.
f. Petal.
g. Lip, spread out.
h. Anther.
i. Pollinia.

a. Natural size. Remainder enlarged.

Fig. B. **Taeniophyllum calceolus**, Carr

a. Flower.
b. Dorsal sepal.
c. Lateral sepal.
d. Petal.
e. Lip, spread out.
f. Column.
g. Anther, from beneath.
h. Pollinia.

All enlarged.

Plate 13 Fig. A. **Taeniophyllum annuliferum**, Carr

a. Plant.
b. Flower.
c. Flower, in section.
d. Dorsal sepal.
e. Lateral sepal.
f. Petal.
g. Lip, spread out.
h. Anther, from above.
i. Anther, from beneath.

a. Natural size. Remainder enlarged.

Fig. B. **Taeniophyllum filiforme**, J.J.S.

a. Plant.
b. Dorsal sepal.
c. Lateral sepal.

d. Petal.
e. Lip, spread out.
f. Column and anther.
g. Anther.
h. Pollinia.
a. Natural size. Remainder enlarged.

Plate 14 **Taeniophyllum rostratum,** Carr

a. Plant.
b. Flower.
c. Flower, in section.
d. Dorsal sepal.
e. Lateral sepal.
f. Petal.
g. Lip, spread out.
h. Apex of lip, spread out.
i. Anther, from above.
j. Anther, from beneath.
k. Pollinia.
a. Natural size. Remainder enlarged.

Plate 6

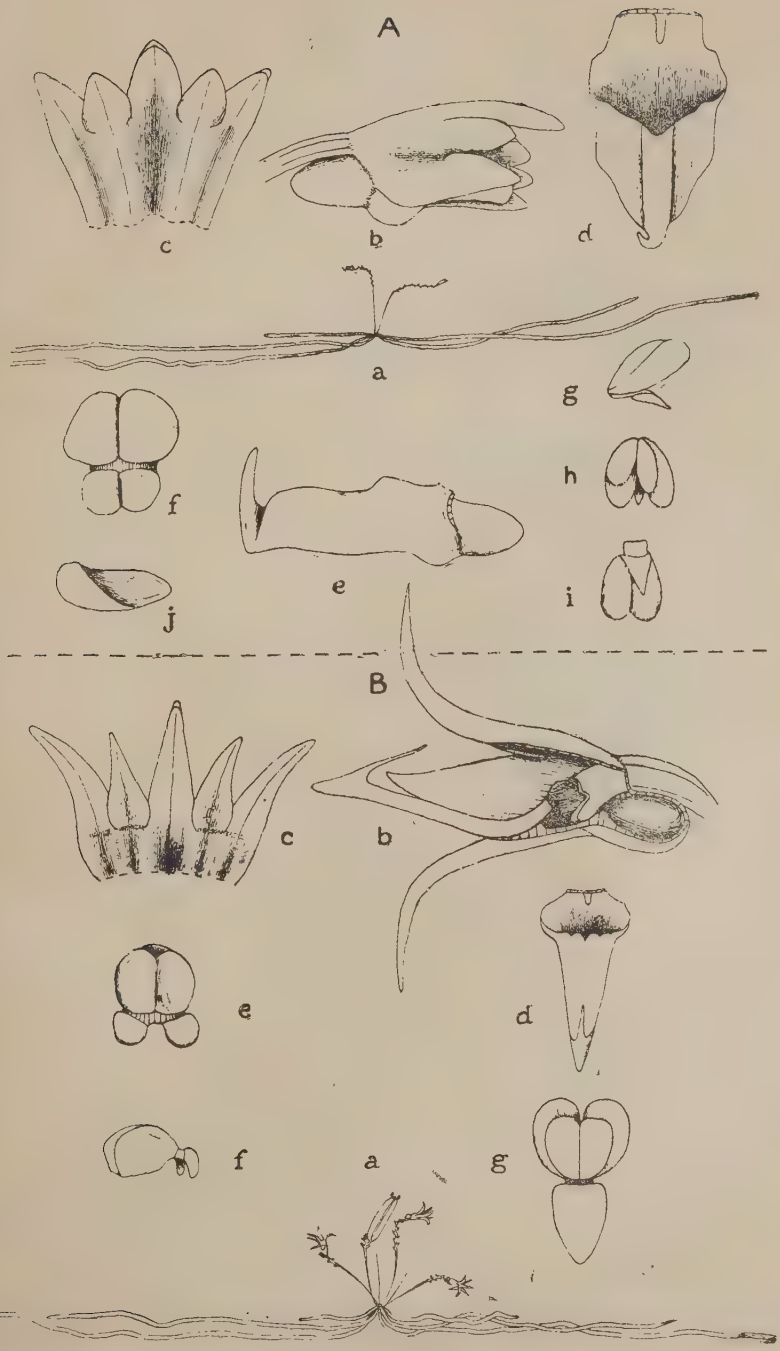


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Plate 7

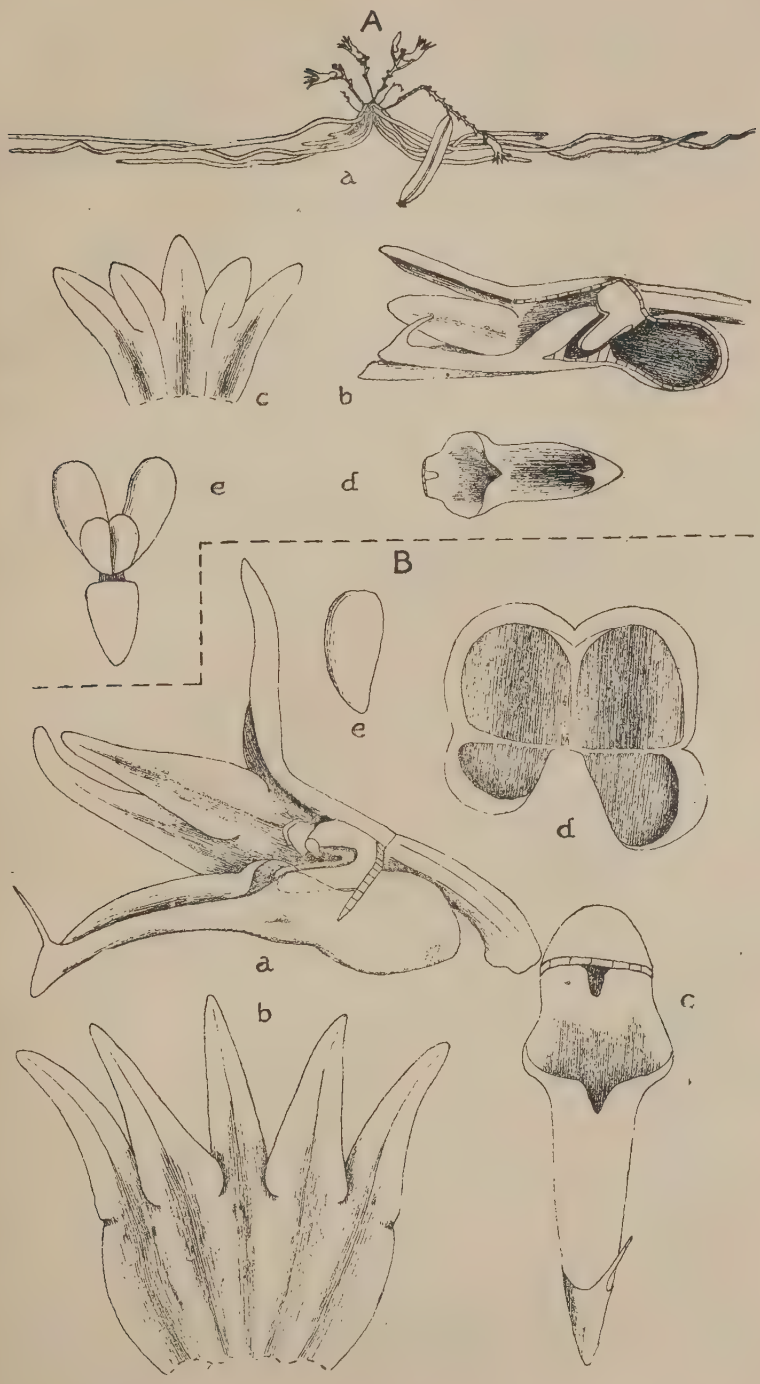

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Plate 8

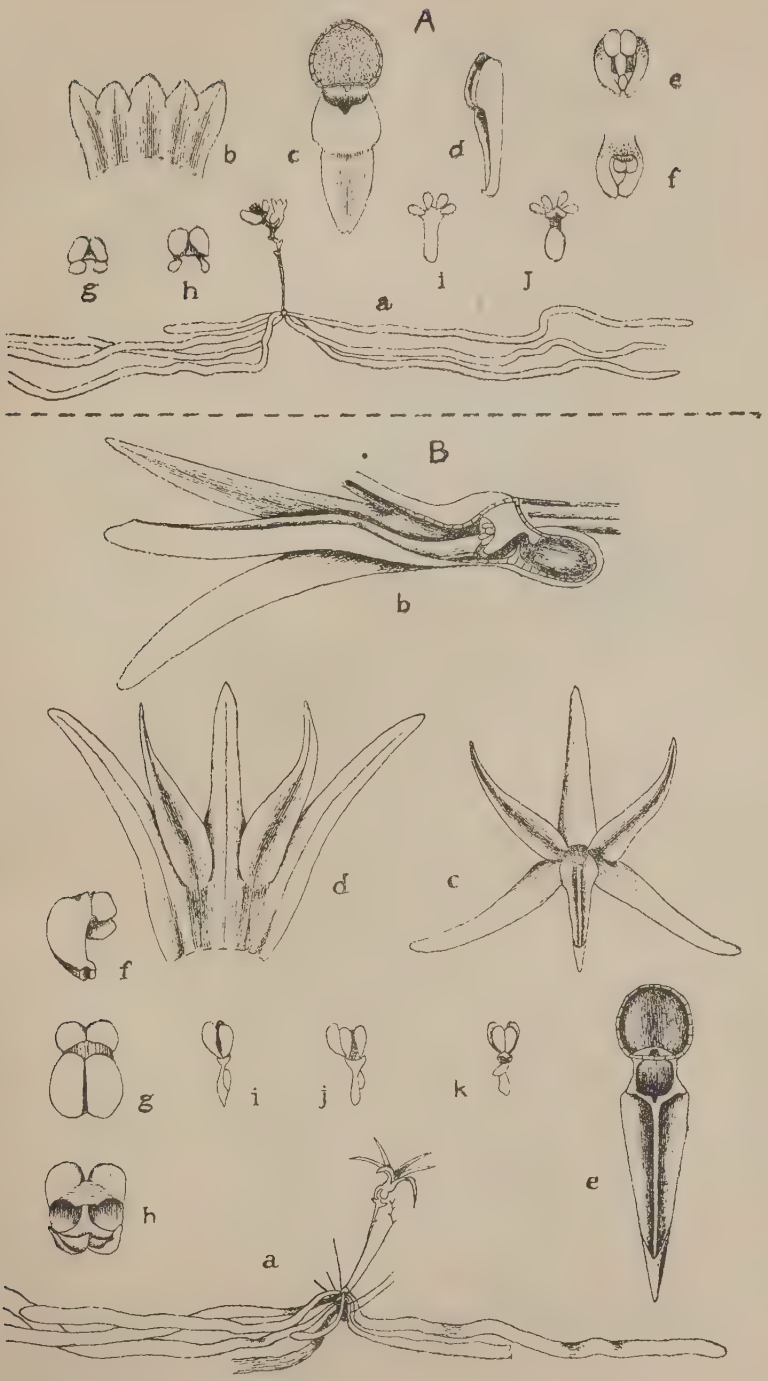

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Plate 9

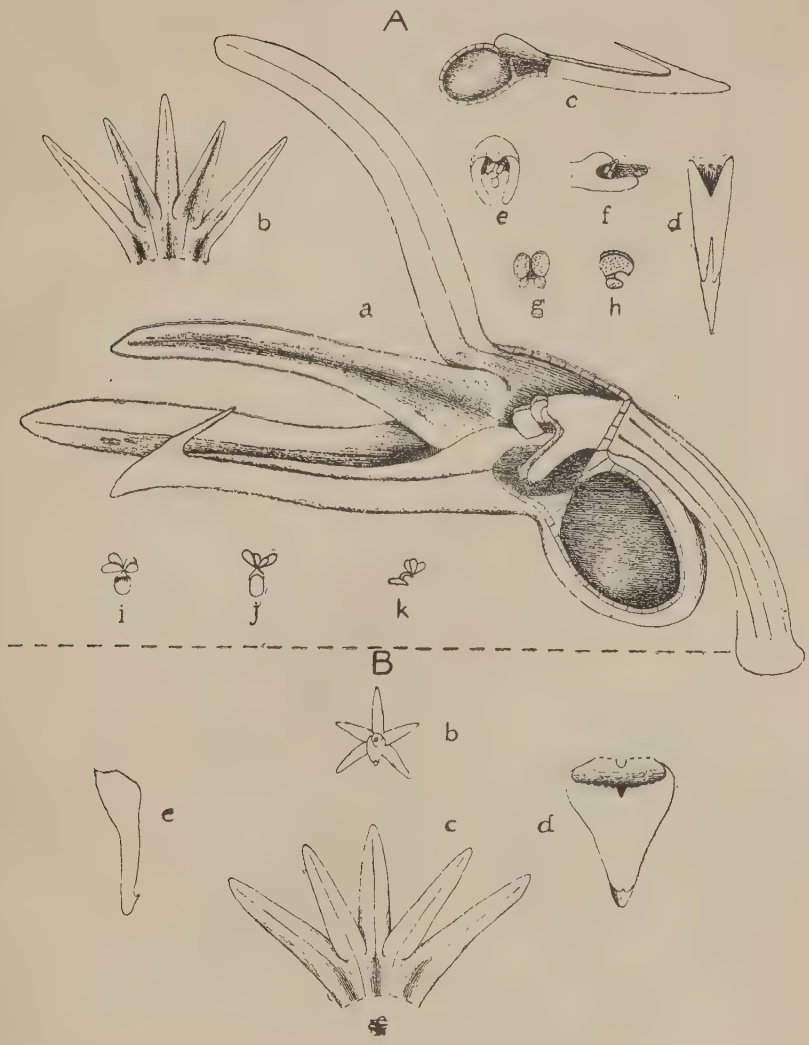

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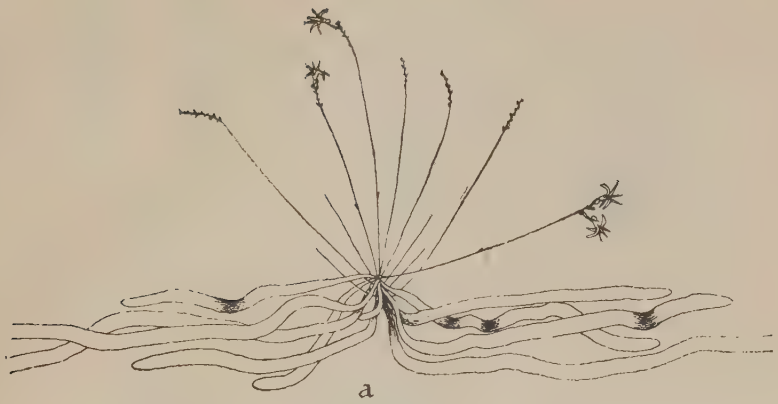
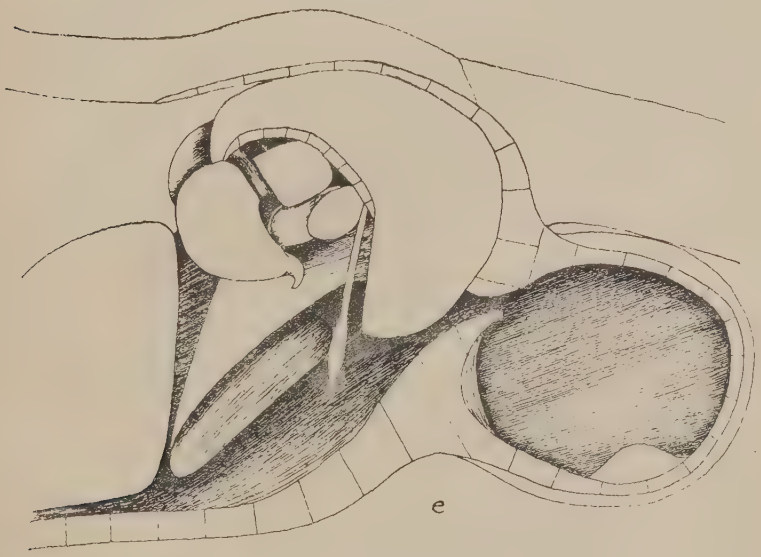
Plate 10





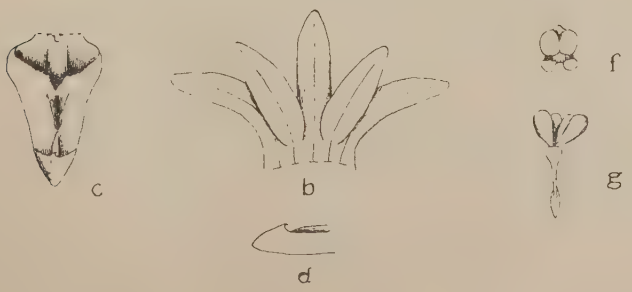


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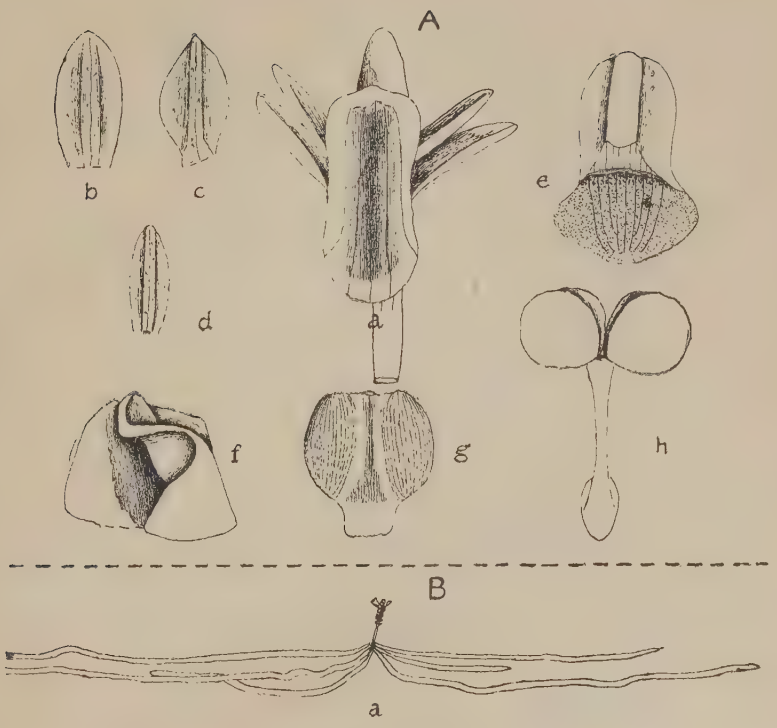
Plate II



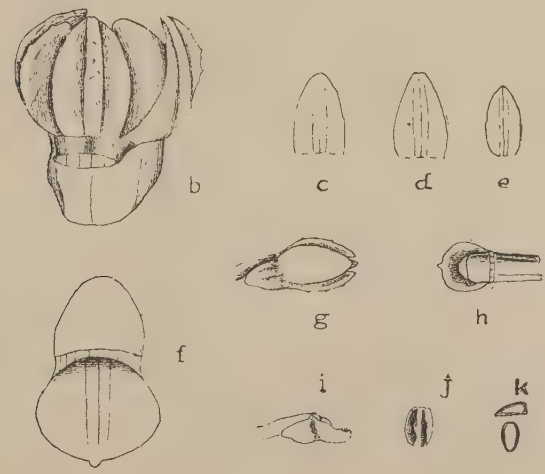


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Plate 12

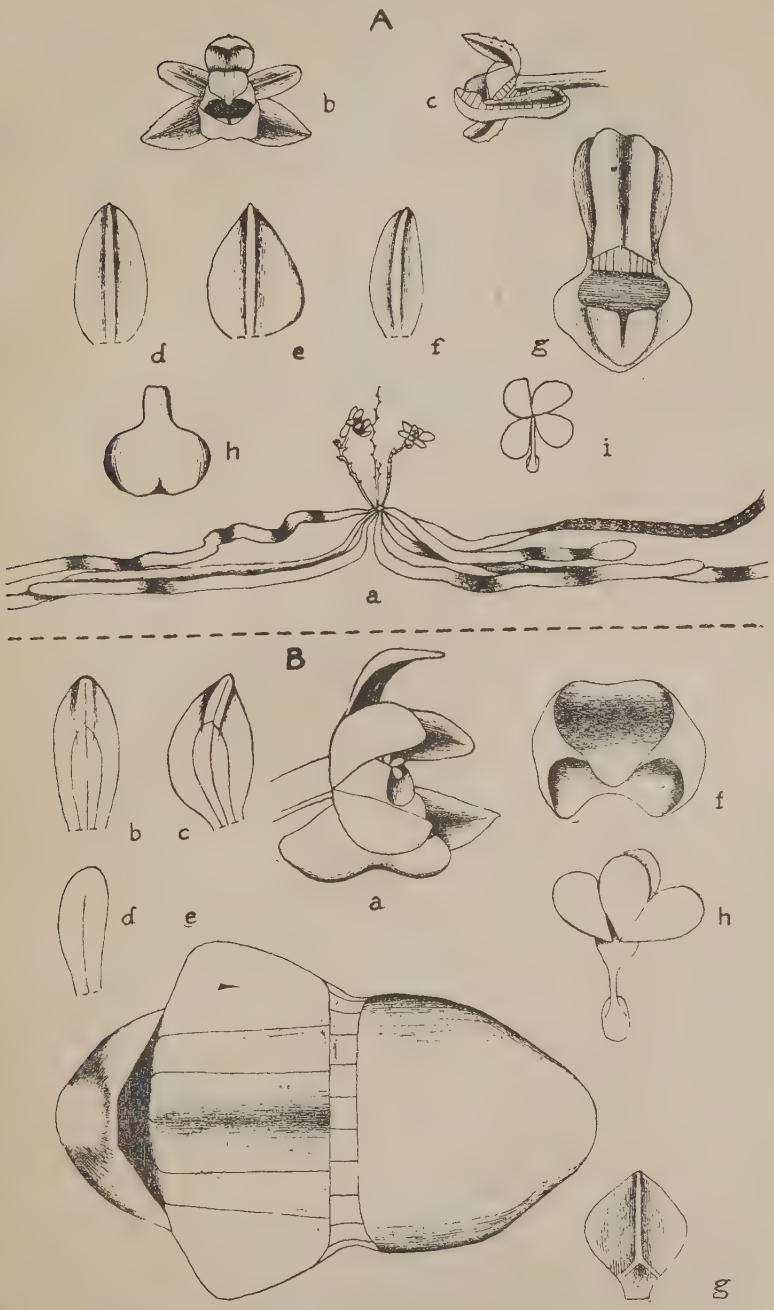

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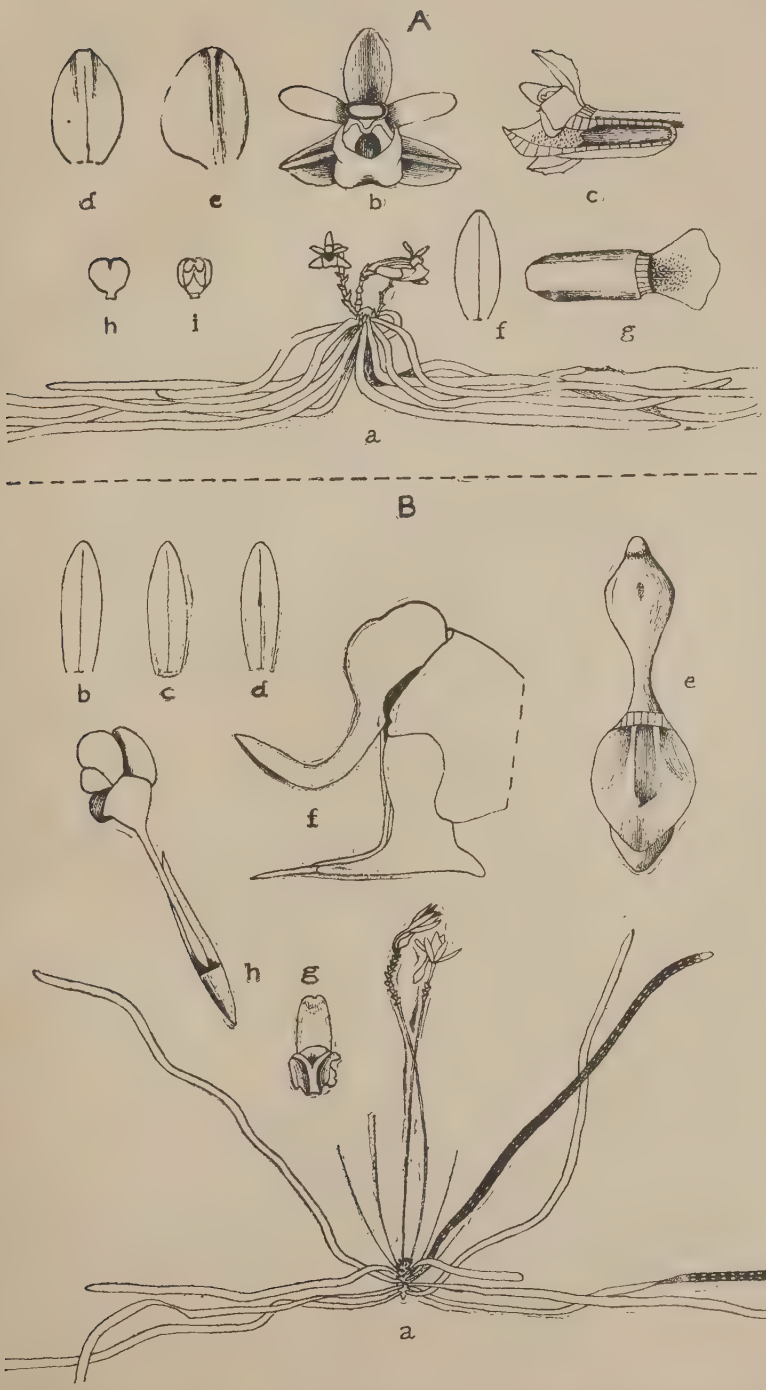
Plate 13



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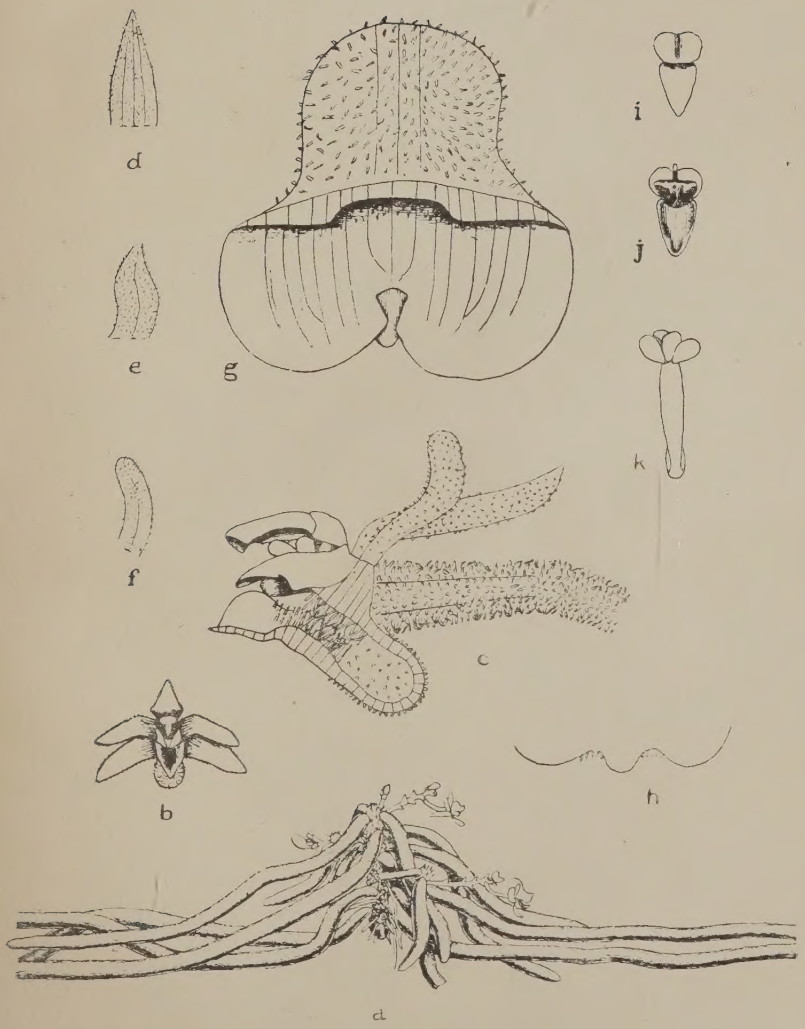

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